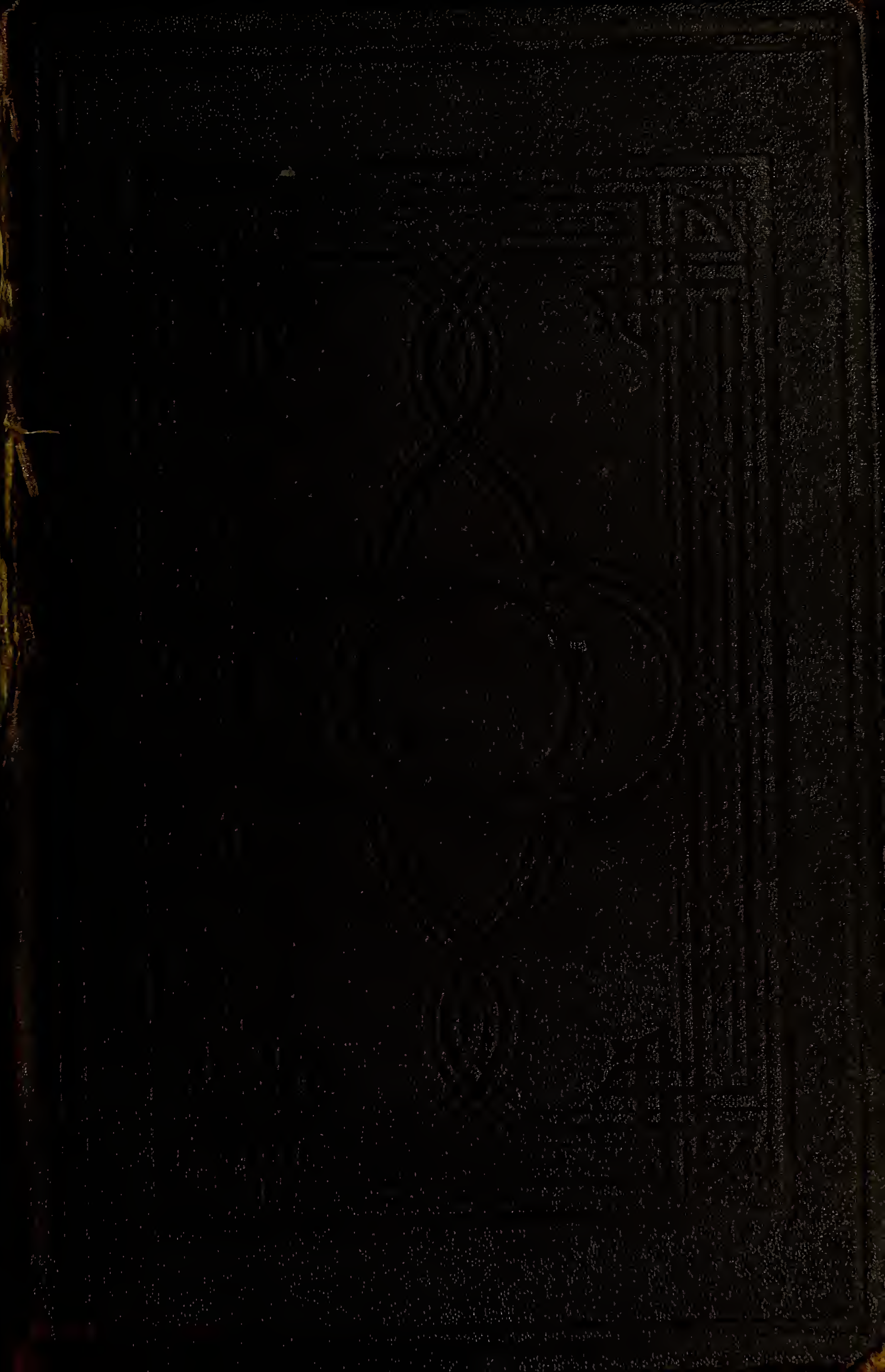

The University Library
Leeds

ET AUGEBITUR SCIENTIA

STORE

Medical and Dental
Library

30106 004232871

Stack
WL 100
JON

STORE ~~D 160~~

D/60

STUDIES
ON
FUNCTIONAL NERVOUS DISORDERS.

STUDIES

ON

FUNCTIONAL NERVOUS DISORDERS.

BY

C. HANDFIELD JONES, M.B. Cantab., F.R.S.,

PHYSICIAN TO ST. MARY'S HOSPITAL.

LEEDS SCHOOL OF MEDICINE

LONDON:
JOHN CHURCHILL AND SONS, NEW BURLINGTON STREET.
MDCCCLXX.

UNIVERSITY OF LEEDS
MEDICAL LIBRARY.

PRINTED BY J. E. ADLARD, BARTHOLOMEW CLOSE.

605783

LEEDS SCHOOL OF MEDICINE

TO

SIR JAMES RANALD MARTIN, C.B., F.R.S.,
PHYSICIAN TO THE COUNCIL OF INDIA, ETC. ETC.,
WHOSE EXPERIENCE AND ASSISTANCE HAVE AIDED ME GREATLY,

AND

EDWARD HENRY SIEVEKING, M.D., F.R.C.P.,
PHYSICIAN TO H.R.H. THE PRINCE OF WALES,
MY OLD FRIEND,
COLLEAGUE AND COLLABORATEUR,

I DEDICATE THIS VOLUME

IN TOKEN OF

MY SINCERE AFFECTION AND REGARD.

PREFACE.

LEEDS SCHOOL OF MEDICINE

The Second Edition of this work has expanded rather against my will to a much larger size than the first. Much has been added, and much rewritten, and the result has been, I trust, to improve the whole materially. It might be condensed, no doubt, but I have always had a preference for works which were somewhat diffuse, as being more easily read and remembered than those which were of closer texture and required a stronger digestion. My aim has been (1) to be practical; (2) to view morbid phenomena as far as possible in the light of scientific truths. I may enumerate as the principal conceptions which I have utilised—(*a*) that of primary functional paralysis; (*b*) that of inhibitory paralysis; (*c*) that of an unsuitable stimulant becoming a paralysing irritant; (*d*) that of the affinity between spasm and paralysis; (*e*) that of the loss of retentive power in the capillaries under influences which paralyse nerve power; (*f*) that of the analogy between central and so-called peripheral nerve disorders, or those of separate centres; (*g*) that of the prevalence of miasms capable of causing neuralgia and its congeners. I believe that the practitioner who has familiarised his mind with these views will find himself better able to comprehend and to deal with the varying phenomena of very many maladies.

Other points which I have more or less insisted on are, the great diversity of human frames in respect of their qualities; the utter insufficiency of the mere *nominal* diagnosis of a disease in a great many instances, and the necessity of searching for a *cause*, and of estimating the *quality* of the morbid action; the existence of imperfect and of transitional forms of disease; the importance of administering the proper doses of remedies in each case, which is often too little considered.

If it should appear to any that I have given too much space to Malarial disease, my justification must be that I have hoped my volume might be useful not only to practitioners at home, but to those whose lot is cast in hotter climates. My readers will see that I am very far from being a sceptic in medicine, although I often decline to lay down rules for *the* treatment in any particular disease. Where the conditions are so varying sound principles are much safer guides than special directions.

Though I know too well that medicine cannot give fresh life when the instruments necessary for its production are decayed, or utterly prostrated, I cannot doubt that it avails to restore, and to increase life. It can arrest destructive morbid processes, recruit waning vitality, and invigorate the bodily powers to endure fatigue, and accomplish more than they could unaided. If opium or strychnia suitably used enabled me to do more bodily or mental work than I could have accomplished without, the practical result is that the vital efficiency of my organs is increased. No one, of course, imagines that force can be infused into the system, as if it were poured out of a bottle, but the fact is, that the addition of some drugs to the blood enables the organs to exert more power than they could have alone, and this without any subsequent collapse.

That the "mysterious something"—*sui generis*—as Professor Stokes calls vitality is not a mere modification of chemical and mechanical forces seems to me certain from the complicated construction of an organised body, which can never be imitated in the faintest degree in the laboratory; and also from the very much greater amount of force which is produced in some frames than in others, though the blood is far less alimented in the first than in the second. A Swiss acting as guide among his mountains for at most 5 months of the year, and dwelling the other 7 as a mechanic in a town, displays an amount of strength and endurance far above what an average Englishman can, though his dietary would be semi-starvation to the latter. Surely the nerves and muscles of the one must have more of the "mysterious something" in them than those of the other. It is the same difference which enables one person to struggle through a fever, while his fellow sinks.

To acquaint ourselves thoroughly with the operation of remedies on this vital force in the different organs is the great task of our day.

[illegible]

LEEDS SCHOOL OF MEDICINE

CONTENTS.

CHAPTER I.

PAGE
INTRODUCTORY 1

CHAPTER II.

GENERAL PATHOLOGY 6

CHAPTER III.

CEREBRAL ANÆMIA 64

CHAPTER IV.

ANÆMIA OF THE SPINAL CORD 82

CHAPTER V.

HYPERÆMIA OF THE BRAIN 86

CHAPTER VI.

SPINAL HYPERÆMIA 98

CHAPTER VII.

CEREBRAL PARESIS 103

CHAPTER VIII.

SPINAL PARESIS 127

CHAPTER IX.

CEREBRAL EXCITEMENT 155

CHAPTER X.

DELIRIUM TREMENS 193

CHAPTER XI.

PAGE
HEAT-STROKE 213

CHAPTER XII.

TETANUS 239

CHAPTER XIII.

TETANILLA 273

CHAPTER XIV.

CATALEPSY 277

CHAPTER XV.

EPILEPSY 284

CHAPTER XVI.

INFANTILE AND PUERPERAL CONVULSIONS . . . 329

CHAPTER XVII.

CHOREA 343

CHAPTER XVIII.

PARALYSIS AGITANS 382

CHAPTER XIX.

SPASMODIC AFFECTIONS 388

CHAPTER XX.

DROWSINESS 403

CHAPTER XXI.

SLEEPLESSNESS 408

CHAPTER XXII.

HEADACHE 416

CHAPTER XXIII.

VERTIGO 438

CHAPTER XXIV.

NIGHT TERRORS IN CHILDREN 451

CHAPTER XXV.

PAGE
Spinal Irritation 457

CHAPTER XXVI.

Hysteria 468

CHAPTER XXVII.

Hypochondriasis 487

CHAPTER XXVIII.

Facial Neuralgia 497

CHAPTER XXIX.

Facial Paralysis 513

CHAPTER XXX.

Retinal Hyperæsthesia 517

CHAPTER XXXI.

Acoustic Neuroses 531

CHAPTER XXXII.

Throat Dysæsthesia 536

CHAPTER XXXIII.

Spasmodic Stricture of the Œsophagus . . 541

CHAPTER XXXIV.

Lingual Hyperæsthesia 545

CHAPTER XXXV.

Brachial Neuralgia 550

CHAPTER XXXVI.

Sciatica 561

CHAPTER XXXVII.

Myalgia 572

CHAPTER XXXVIII.

Cardiac Neuroses 574

CHAPTER XXXIX.

PAGE
PULSATION OF THE ABDOMINAL AORTA . . . 612

CHAPTER XL.

RESPIRATORY NEUROSES 615

CHAPTER XLI.

GRAVES' DISEASE 652

CHAPTER XLII.

ABDOMINAL NEUROSES 662

CHAPTER XLIII.

NEUROSES OF THE LOWER INTESTINE . . . 694

CHAPTER XLIV.

NEUROSES OF THE URINARY ORGANS . . . 700

CHAPTER XLV.

UTERINE NEUROSES 721

CHAPTER XLVI.

SPERMATORRHŒA 730

CHAPTER XLVII.

CUTANEOUS NEUROSES 734

CHAPTER XLVIII.

MALARIAL DISORDER 754

CHAPTER XLIX.

SECRETION FLUXES 787

CHAPTER L.

INFLAMMATIONS 793

CHAPTER LI.

REMEDIES 800

LEEDS SCHOOL OF MEDICINE

CLINICAL OBSERVATIONS
ON
FUNCTIONAL NERVOUS DISORDERS.

CHAPTER I.

INTRODUCTORY.

Of all the parts which go to make up the wonderful whole of the human body, there is none to which a deeper and more mysterious interest is attached than to the nervous system. By this, we think and move, and have our conscious being; in this, if anywhere, inhabits our "divinæ particula auræ;" by this, we are linked with the outer world, and are capable of affecting and being again affected by the persons and things around us. By this, our immaterial acts upon and sways our material part; and by the higher development of this, and its capability for higher actions, man is especially distinguished from the lower creation. All the passions and emotions, all the intellectual efforts, all the perceptions and recollections, operate through and on this system. If this be so, is it any wonder that exhaustion should frequently befall this delicate and complex machinery, or that its disorders should be amongst the most frequent that our fallen nature is doomed to bear? Even under favorable circumstances, the nervous system must often be hardly taxed: how much more, then, will this be the case when sorrow, toil, and anxiety predominate in the lot assigned!

It is difficult to form a decided opinion on the matter; but there seems, I think, reason to entertain the belief that failure of nervous power is much more characteristic of disease of the present day, than of that which prevailed forty years ago. For this there may be various causes: the greater confinement of large numbers of the population within doors, and often in unhealthy rooms or workshops; the harder struggle to be maintained in the battle of life, the greater amount of the *commoda vitæ,*—may all tend to increase the susceptibility of the nervous system, and to impair its resisting power. Further, in the following instances we have, it seems to me, considerable evidence of the altered character of morbid action, depending, in all probability, on still more general causes than those just mentioned. (1) Sir Ranald Martin informs me, that whereas invalids returning from India used to take leave of their agues when they arrived in this country, this is no longer the case, relapses being of frequent occurrence. Practitioners of long experience also tell us that aguish disorder prevails of late years in places where it was previously unknown, without there being any change in the state of the soil to account for it. (2) Rheumatic fever, as I see it at present in my hospital wards, is for the most part a very different affair from what it must have been when the classical descriptions of it were framed. There is no high inflammatory fever, but only a moderate pyrexia; the remarkably full bounding pulse is almost invariably absent; the tongue is often but moderately coated, the articular affection mild enough. The malady, in short, is on a reduced scale. Moreover, when the malady is more severe, it tends altogether in the direction of asthenia, and the patient's condition is much more suggestive of stimulation than of depletion, of the brandy bottle than of the lancet. I cannot think it was always so. I may add that my own experience certainly indicates that cholera has a modifying influence on disease. I have not met with nearly so many peculiar neuroses of depression the last few years, as I did for three or four after the last epidemic.

However the exact truth may be, whether the type of disease is altered or not, I hold it to be abundantly clear that the great majority of disorders we have to treat at the present time show more or less marked indications of failure of nervous power; and I believe it to be a matter of great practical moment to keep this steadily in view. While, however, believing this, I also think that our current pictures of disease are taken far too exclusively from the sick field of large towns; and I am much inclined to think that if our rural brethren wrote as much as their urban fellows do, they would give a somewhat different account.

There is one large topic closely related to that just noticed which I must allude to—I mean the *indefiniteness* of most of the morbid conditions which we term Diseases, and to which we give names. In the following pages we shall meet with abundant evidence that very often indeed the mere name of a malady, as stated in a nomenclature, is a very unsafe guide to its treatment. The reasons are that the same morbid phenomena may be dependent on very different causes, or, if the cause is the same, the quality of its results is very various owing to peculiarities in the individual systems affected. Thus typhus miasm will cause delirium in most patients, but this delirium will not be of the same quality in all, and will have to be treated differently. Living bodies contrast strongly with inanimate in their inconstant behaviour under the application of the same test. So much is this the case that it has passed into a proverb—"What is one man's meat is another man's poison." I hold that a diagnosis which goes no further than distinguishing a disease as gout, psoriasis, rheumatic fever, erysipelas, chorea, &c., and does not attempt to appreciate the peculiar circumstances of the individual sick man, falls very far short of what is needed for a rational therapy. For some further discussion of this subject I refer to the 'Brit. Med. Journ.,' July 11th, August 8th, and Sept. 26th, 1868.

The course I propose to pursue is, first, to consider the behaviour of the nerves and nervous centres in certain well-marked simple morbid states, and subsequently to notice the more important features of several classic diseases, and of some other less commonly recognised disorders. I do not intend to deal with the results of manifest organic lesion, but to confine my attention chiefly to such disorders as are termed functional. It seems to me a vain dispute, whether in strict accuracy there are, or are not, any such disorders. The probability is that there are not—that in all morbid action the cells and the fibres of the organs undergo some molecular change from their perfectly normal condition. It is, however, perfectly certain that there are very grave disorders in which the most careful scrutiny fails to detect any actual change, in which complete recovery is perfectly possible, and in which the "juvantia" are such as operate more in modifying the power of the organs than their texture. To take an example: a man may have paralysis of some muscle or group of muscles which yields to the use of strychnia or galvanism. Now, these agents can scarcely be thought to act otherwise than by exciting and increasing the vital power of the affected nerve or nervous centre; or, to put it shortly, as nerve tonics. Cod-liver oil, iron, and phosphorus might be given without effecting the same beneficial change—at least, as speedily, because they are rather analeptics than tonics. They may improve the nutrition of the nervous tissue, but they do not directly arouse it. Now, between such a case of functional paralysis as we have supposed, and paralysis from organic lesion, there is a wide interval. Strychnia and galvanism will, in all probability, make the latter worse; certainly, will not cure it. Something more is needed in this case than to arouse defective nervous energy. Between the typical cases which we have taken of functional and organic disease, there intervene numerous instances of more or less mixed character. Inflammatory disease is from one point of view organic, from another functional. It commences essentially as the latter, it ends as the former.

Again, the instances are numerous in which nerve disorder is dependent on the presence of poisonous matter more or less distinctly demonstrable in the blood. These I shall consider as within my province when the molecular derangement does not proceed so far as to cause positive lesion. Even in these cases we have, I think, clear proof how much mere defect of dynamic energy has to do with the morbid phenomena. Two persons may have their blood poisoned alike by urinary excreta, by syphilis, or by fever miasm. In one the nervous centres are overborne by the toxic agent, and succumb, expressing their distress by delirium, convulsions, or paralysis. In the other they do not suffer at all; the stronger organs endure what the weakly cannot.

The arrangement I shall adopt is merely topographical, but will, I hope, be found practically convenient. Commencing with the encephalon, including the cerebral hemispheres, mesocephale, cerebellum, and medulla oblongata, we shall proceed to the spinal cord, and thence to the several nerves, or nervous districts, which are found by experience to be most prone to disorder. Under the term cerebral hemispheres is comprised all the convoluted grey exterior of the brain, with its basal ganglia, the corpora striata and thalami optici, and the various longitudinal and transverse commissural fibres. The functions of these parts are eminently mental; they minister to conscious sensation, memory, reflection, judgment, and volition. Their structure is essentially similar to that of other nervous centres, but has this peculiarity—that the grey matter contains a very considerable quantity of loose granular material, and is by no means chiefly made up of nervous cells. This seems to have relation to the rapid nutritional change required by the active function of the tissue. The perfect cell indicates a greater degree of permanency, and slower change than the nucleus with diffused granular material. The very copious supply of blood sent to the hemispheres is also in harmony with this view. The cerebellum is probably concerned in regulating the motor nervous actions, and is, perhaps, the special seat of the muscular sense. Dr. Dickinson's researches lead him to regard it as a source of voluntary motor power to the muscles supplied by the spinal nerves. "It influences the lower more than the upper limbs, and produces habitual rather than impulsive movements. Each lobe affects both sides of the body, but most that opposite to itself. Its co-ordinating power, by which it harmonises the action of the voluntary muscles, is similarly distributed." ('Proc. of Royal Soc.,' vol. xiii, p. 179.)

The mesocephale is connected with the two chief nerves of special sense, and is, we know from experiment, capable of producing general convulsions when directly irritated. The medulla oblongata is the chief centre of the respiratory nervous actions, and is capable of influencing very materially the cardiac movements; with it are connected all the cranial nerves from the fifth to the ninth. The emotional faculties have probably their chief seat in this region, and in the adjacent mesocephale. The spinal cord constitutes by its grey matter an independent centre for the nerves which are implanted in it, but is naturally associated by its longitudinal commissural fibres with the superior nervous centres in sensation and volition. The cervical and upper dorsal regions of the cord constitute, according to Bezold, a special motor centre to the heart, furnishing three fourths of its entire propulsive force. This statement, however, probably underrates the importance of the ganglia adjacent to and in the substance of the organ. The sympathetic is partly an independent system, partly an offset from the cerebro-spinal; as, indeed, its anatomy indicates.

Mr. Simon regards the convoluted surface of the cerebrum as the primary centre. The cerebellum, the corpora striata and optic thalami, the grey matter of the locus niger, pons Varolii, and mesocephale, constitute the secondary centres. Tertiary centres are the grey matter of the spinal cord, the ganglia of sensitive nerves, and those belonging to the special senses and special movements which exist about the mesocephale. Quaternary centres are the ganglia of the sympathetic. This grouping seems to me convenient, and I shall occasionally employ his terms.

CHAPTER II.

GENERAL PATHOLOGY.

Before entering on the special study of disease, it seems desirable to allude briefly to some well-established points in neurophysiology and pathology, and to discuss in a general manner some questions which are as yet unsolved. The subjects thus elucidated will be convenient for future reference.

(I) It is certain that the nervous cords, whether motor or sensory, in the whole of their course, from their origin to their peripheral distribution, allow of no communication of the active state from one fibre to another. A single point of the skin, when touched, is distinguished by the sensorium from the adjacent, the size of the district thus represented in the brain varying inversely with the abundance of nervous supply; and a single muscle can be put into action without exciting others receiving nerves from the same trunk. It is remarkable how the stimulus of the will can be limited to certain groups of nerve-cells at some distance from each other without affecting others in close proximity. We can call into action the triceps extensor cubiti without moving any other muscle. Yet, the filaments animating this nerve must come, in all probability, from various points of the spinal cord between the fifth cervical and first dorsal nerves; and the cells of these points alone are excited, while others close by remain inactive.

(II) While the above, which Romberg terms the law of isolated conduction, holds in the peripheral tracts, we find another of a very different kind to come into play in the nervous centres. In them we have (*a*) what is termed excito-motory or reflex action, viz. an impression from a centripetal nerve, producing an active state of a motor through the intermedium of certain multipolar cells. Sensation almost invariably ensues at the same time, but is not an essential part of the chain of actions. Volition is quite unconcerned in the act, and is often quite incapable of controlling it. (*b*) The impression arriving at the centre is communicated, not to a motor, but to a sensory nerve-root, perhaps to several adjacent, or to another more remote. In this way, sensations are produced which continue as long as the original impression is maintained by its existing cause. In certain states of great excitability of the nervous centres, the range over which the primary stimulus may extend, especially in the case where motor nerves are affected, is very considerable. In dealing with neuralgic disorders, this point—viz. the irradiation, as it is called, of sensations—is of capital importance, and may often lead to the discovery of the cause of suffering, which would otherwise have remained quite obscure.

Pflüger lays down the following laws:—(1) That when reflex action occurs on one side, it is always on that where the sensitive nerve has been excited; and if it occurs on both sides, it is strongest on the side stimulated. (2) When reflex action occurs on both sides from excitation of one, it affects parts symmetrically situated. (3) Reflex excitation in cerebral nerves extends from before backwards, in spinal nerves from behind forwards.[1]

Instances of excito-motory action are too familiar to need special mention. The following examples are good illustrations of excito-sensory phenomena, or of co-ordinate sympathies as they are termed by Mr. Simon. Romberg gives the case of a girl, æt. 16, who after a slight injury to the outer side of the right middle finger was affected with violent pains, attended after some days by inflammation and an eruption of phlyctenæ, with dusky redness of the hand and forearm. "Suitable remedies removed the inflammation, but a painful sensation remained in the point of the finger, which was increased by contact or spontaneously, and frequently induced sympathetic sensations in the hand, arm, neck, and legs of the same side. . . . At a later period spasms in the distributions of the facial and accessory nerve of the same side supervened" (vol. i, p. 19). Wardrop relates the case of a young gentleman who received a cut with a gun-flint obliquely across the radial side of the distal phalanx of the left thumb. The wound healed readily, and on the sixth day after the accident the cicatrix seemed perfectly natural, notwithstanding he complained of great pain, not only in the wounded thumb, but also in the forefinger and radial side of the middle finger, which extended up the arm and as far as the neck and side.

---

[1] V. 'Brit. and For. Med.-Chir. Rev.,' Jan., 1864, p. 9.

Three weeks later, during aggravations of suffering, the pain extended over the whole hand, arm, neck, and even down to the back. After complete division of the nerve above the injured part there ensued instantly a complete abatement of all the symptoms; and though they recurred subsequently at various times to a notable extent after any slight perturbation, he soon recovered almost perfectly ('Med.-Chir. Trans.,' vol. xii, p. 205). In most instances, as in those now cited, the excitement is diffused on the same side of the cord, but sometimes it spreads transversely, affecting, as Mr. Simon says, "the correspondent grey matter on the opposite side of the median plane, and giving rise to a subjective sensation of disease symmetrical with that which really exists." He cites a case from Ollivier, the subject of which was almost entirely anæsthetic in the left leg and left half of the trunk, but nevertheless, when the skin of the left leg was pinched, a sensation was felt at the corresponding spot of the opposite and healthy limb. The left tertiary centre, owing to an injury of the cord in the cervical region, could not convey the impression it had received to the sensorium; but the fact of the latter being affected as if the contact had been made on the right limb proves that the excitement must have crossed over to the tertiary centre of that side. "In the same manner of transverse diffusion of excitement," he proceeds "it apparently arises that patients so often refer pain to a tooth exactly opposite to that which is carious, and which is the real cause of their suffering" ('Lect. on Pathol.,' p. 210).

It is by no means unfrequent that the excitement takes its starting-point in an internal organ supplied by sympathetic nerves, while it is chiefly felt in some external part. Of this the pain running down the left arm in disease of the heart is a familiar instance. It is worthy of remark, and consonant with what has been above stated, that though the pain-causing action is usually on the same side as the irritation from which it proceeds, and affects one arm only, it may diffuse itself more widely and affect both or even all the four limbs, as well as the neck, the back, and even the testes, or may take a transverse direction to the right arm only (Walshe). These variations probably depend more on peculiar susceptibilities in different parts of the nervous centres and nerves than on different distributions of the latter.

(III) The law of eccentric phenomena affirms that every sensation, as it becomes perceptible to consciousness, is referred to the periphery of a sensitive fibre, no matter at what part of the whole length of the fibre the impression is made. This law is to a certain extent true, but admits, as I shall point out subsequently, of numerous exceptions.

(IV) It seems to be well ascertained that an *unfelt irritation* may give rise to very various morbid phenomena, affecting both the motor and sensory nervous organs. Dr. Brown-Séquard maintains that various forms of insanity, of vertigo, epilepsy, of hallucinations and illusions, and also extasis, catalepsy, hysteria, chorea, hydrophobia, tetanus, &c., may be due to irritations starting from a centripetal nerve, and frequently slightly felt, or unfelt, and that the suppression of these irritations may promptly cure the patient. Graves records a case (*vide* 'Clin. Med.,' p. 244) where an extremely severe cough, which had resisted all treatment directed to relieve bronchitis, ceased at once on the expulsion of a mass of tape-worm by a dose of turpentine. It does not appear that any symptoms had existed in this case to announce the presence of the intestinal parasite. Perhaps the following instance is still more proving, inasmuch as the seat of the irritation was in a much more sensitive part. A married lady had suffered for a considerable time from a spasmodic pain in the womb, which ceased completely on the extraction of a tooth that had not caused any material annoyance.

(V) Attention has lately been directed by Pflüger and Lister to certain nerve phenomena, which the former terms inhibitory (*hemmungs*), and supposes to belong to a certain set or system of nerve-fibres whose sole function is to arrest or diminish action. Lister, on the contrary, concludes, from his inquiries,[1] "that one and the same afferent nerve may, according as it is operating mildly or energetically, either exalt or depress the functions of the nervous centre on which it acts. It is, I believe (he says), upon this that all inhibitory influence depends; and I suspect that the principle will be found to admit of a very general application in physiology." The following are instances of inhibitory action:—The poles of a galvanic apparatus being fixed to the spinous processes of the ninth and twelfth dorsal vertebræ of a rabbit, currents were passed through the spine (of course, affecting the cord), with the effect of inducing "complete relaxation and quiescence of the small intestines, which had been previously in considerable movement, while the muscles of the limbs were thrown into spasmodic action; but on the discontinuance of the galvanism the previous intestinal motion returned." Weaker currents were then passed, and markedly increased the action of the intestines in every instance during the first twenty-five minutes. In the next half-hour the increase of action from the galvanism, though still distinct, was less strongly marked, and at the end of that period, with stronger currents, the inhibitory influence was also found to be much less complete than before, indicating that the parts of the nervous apparatus concerned were in a less active condition, no doubt in consequence of exhaustion. Increased movements of the intestine were produced by direct irritation of the cord with a fine needle. It was very worthy of remark, that violent struggling of the rabbit, when the intestines were in pretty free movement, was followed by absolute and universal quiescence of those organs for several seconds. This showed that an inhibitory action was capable of being produced naturally as well as artificially. The recent observations of Hufschmidt and Moleschott,[1] as to the effect of mechanical irritation of the medulla oblongata and spinal cord on the frequency of the pulse, accord very much with those of Lister. They found that slight electric irritation of the medulla oblongata augmented, while more powerful diminished, the frequency of the heart's action, or even arrested it. (2) Powerful mechanical irritation of the medulla oblongata diminished the frequency of the heart's action. (3) Slight irritation of the spinal cord increases, powerful irritation diminishes, the frequency of the heart's action. Weber and Bernard[2] had long before demonstrated the possibility of arresting or slowing the action of the heart by galvanizing the medulla oblongata or the pneumogastic nerve.

---

[1] 'Proceedings of the Royal Society,' No. 32, p. 367.

Eulenburg and Landois, reviewing the researches of physiologists, consider it proved that there are four systems of inhibitory nerves—the cardiac, the respiratory, the intestinal, and those which restrain the reflex movements. There are four sets of neuroses corresponding to these. We shall study them in subsequent chapters devoted to these subjects. Meanwhile I will only remark that, according to my views, there are no special systems of inhibitory nerves, but that (following Mr. Lister) I believe that any afferent nerve may act inhibitingly on the centre or centres with which it is connected.

---

[1] Moleschott's 'Untersuch.,' vol. viii, part 6, 1862. 'Syd. Soc. Year-book,' 1863, p. 17.

[2] 'Leçons sur le Système Nerveux,' tome ii, p. 392.

In the 'Cours Scient.,' 1868, p. 422, Bernard speaks most decidedly of the existence of *direct* paralysing nervous influences, which, instead of making muscles contract, paralyse and relax them, and also of *reflex* paralysing nervous influences.

In a paper on "Inhibitory Influence,"[1] I have endeavoured to show that pathological phenomena are not infrequent which seem to be of this nature. I modify, however, the statement of Mr. Lister, as far as to believe that it is not the energetic operation of an afferent nerve that causes inhibitory action, but its being injuriously affected by some impression made upon it. The enfeebled state of the nerve itself, or of the centre to which it proceeds, or the severity or malignity of the impression, may give rise to the peculiar effect. The following instances may be cited as fair examples:—O. J—,[2] æt. 37, got a whitlow on the last phalanx of left thumb; the lymphatics were inflamed, and the axillary glands swollen; the whole arm was very painful. While the limb was in this state, one morning he found that he saw double, and had a squint in the left eye. At the Ophthalmic Hospital it was found that the external rectus muscle was completely paralysed, and he had circumorbital pain. It was supposed that there was periosteal inflammation about the orbit, and pot. iodid. was given; the whitlow was poulticed, and the arm fomented. After a month of this treatment, there was no improvement of the eye, but the arm inflammation had quite subsided. A piece of dead bone was now removed from the seat of the whitlow, soon after which the squint disappeared, as well as the pain in the arm and about the orbit. The external rectus had quite recovered its power. In this instance pain in sensory nerves about the orbit and paralysis of a single motor nerve were co-results of the morbid impression conveyed from the diseased finger to the centre. Dr. Watson refers to the production of amaurosis without visible change in the eye, in consequence, apparently, of irritation of the dental nerves, the blindness ceasing after the extraction of some teeth which had grown irregularly.[3] He quotes from Mr. Lawrence an interesting case, in which the extraction of a carious tooth, with a splinter of wood projecting from one of its fangs, procured the restoration of the sight of the eye of the same side, which had been entirely lost for thirteen months. In such cases, the paralysis of the retina or of the optic tubercles may fairly be designated inhibitory. Two cases of amaurosis and one of ptosis are recorded by Mr. Hancock[1] as cured by the removal of decayed or overcrowded teeth. Mr. Fleischmann[2] gives a case in which an obstinate muco-purulent discharge from the right nostril, which had resisted other treatments, yielded to extraction of the right upper canine. Plucking the large vibrissæ at the entrance of the nostrils will, at least in some persons, cause a notable secretion of mucus, evidently dependent on the pain excited. A gentleman whom I saw with Dr. Hyde Salter found that after fatiguing his right eye with microscope work he had well-marked inflammatory redness confined exactly to the right side of the face, and chiefly affecting the skin of the forehead and infra-orbital region. Here the fatigue of the retina, as I read the case, was reflected on the vaso-motor nerves of the same side of the face; and this is, no doubt, the usual event. But Mr. Paget tells us that he has often had a slightly inflamed left conjunctiva after long working with the right eye, while the left has been all the while closed. This shows that the altered condition of nerve force may be transmitted in the transverse as well as in the vertical direction. Some while ago, I had a gentleman under my care with acne rosacea of the face and head, and chronic corneitis, with vascular development on the cornea. I applied on one occasion some liq. plumbi diacet., diluted with an equal amount of water, to the upper lids (everted), which I found very red. This caused excessive irritation; the eyes became greatly congested, watered extremely, and were very painful; while the skin of the face, the nose especially, became of a deep red, and all the vessels of the face much congested. There was extreme photophobia. It was half an hour before the hyperæmia began to subside. The irritation in this case evidently was reflected from the branches of the first division of the fifth nerve supplying the lids, on to the vaso-motor nerves of the arteries supplying the skin of the face, which, in consequence of the *morbid* impression, became *dilated* —not contracted, as they normally should, according to the law of reflex action. This was a marked example of inhibitory action. Dr. Brinton informed me that he had long held and taught a view almost identical with the above, under the name of "reflex relaxation." The pathology of these cases is, no doubt, the same; a nerve of special sense, a musculo-motor or a vaso-motor, being paralysed, according to the direction which the irritation happens to take. To the same class belong, I think, instances of paralysis produced by exposure to cold and wet, though the paralysis often continues long after the morbid impression has ceased. In Mr. Hancock's communication, a case of lockjaw and of extreme wry-neck are mentioned as having been cured by removal of dental irritation. This shows that it depends very much on the condition of the nervous centre which is affected, what the result of a nervous stimulus shall be, whether paralysing or exciting. So, in some persons opium causes marked powerlessness (a degree of paralysis); in others it tones and prevents fatigue.

---

[1] 'British Medical Journal,' February 5, 1859.

[2] 'Medical Times and Gazette,' January 29, 1859.

[3] Watson's 'Lectures,' vol. i, p. 336.

---

[1] 'Lancet,' January 22, 1859.

[2] 'British Medical Journal,' April 9, 1859.

The only objection which can be made, I conceive, to the above evidence is, that in the instances cited the paralysis depended, not on a direct morbid influence exerted on the tissue of the nervous centre, but on anæmia of the part, produced by the reflection of the original irritation on the vaso-motor nerves supplying its arteries. This is what Dr. Brown-Séquard supposes to occur in reflex paralysis—a form which appears to me to be similar to inhibitory. In reflex paralysis the loss of motor power appears to depend on an actually existing irritation, with which it increases or diminishes, and with the removal of which it ceases. This is evidently almost identical with what we have described above. The only difference is, but this is a very important one, that in many instances of inhibitory action the paretic state of the centre persists for an indefinite time after the cessation of the cause which has morbidly affected it. The grounds which lead me to believe that Brown-Séquard's view is incorrect, or, at any rate, does not comprehend the whole truth, are—(1st) It is difficult to suppose that a spasm of reflex origin should be limited to such a very small extent of vessels as would be involved in some instances, *e.g.* palsy of one sixth nerve, ptosis of one eye. (2nd) Supposing such anæmiating spasm to occur, and to persist for many days or weeks, is it not a matter of certainty that the tissue deprived of its nutrient fluid would fall into a state of decay? Panum states that in cerebral embolism red softening commences after twenty-four or forty-eight hours dating from the apoplectiform attack, and lasts eight to fourteen days, when it is succeeded by yellow softening. In this condition the nerve-fibres and cells are broken up, scarcely distinguishable, in a state of regressive fatty metamorphosis. If it should be objected to this argument that the arterial spasm may not be so complete as to arrest the blood-flow completely, and that the part may receive blood enough to keep it from actually decaying, though not enough to enable it to perform its function, it may well be rejoined that this requires a very nice adjustment of the spasm, such as can hardly be supposed to exist for any length of time, especially when the exciting cause of the spasm has ceased. Bernard says expressly that reflex actions of the vaso-motor nerves are manifested by contraction of the vessels, followed by dilatation. (3rd) It has been found by Gull that irritation of the renal nerves does not cause contraction of the vessels of the spinal cord, nor paralysis of the lower limbs, as Brown-Séquard stated in explanation of the paraplegia from renal disease. (4th) The same cause which, in some persons, produces paralysis, may, in others, give rise to spasm, as we have just seen (p. 13); and it can hardly be thought that local anæmia can conditionate both morbid states. (5th) In some cases of paralysis from exposure to cold and wet,—*v.* one related by Dr. Copland ('Dict. of Pract. Med.,' art. "Paralysis," 76), the paralysis continues long after the exciting cause has ceased, and is removed by stimuli applied to the sensory cutaneous surface. Here the paralysis must be non-organic; and yet it can scarcely be supposed to depend on anæmia of the centres resulting from arterial spasm. On the other hand, it is intelligible that the nerve-cells might be thrown into a state of enfeebled action by the cold, &c., from which they could not easily recover. These cases, though not typically inhibitory, seem to me very illustrative of the nature of the morbid action.

Though, for the reasons above assigned, I cannot accept the doctrine of Brown-Séquard as applicable to all the instances of reflex paralysis, I think that it probably does hold good for some. In malarious fever there is no question that spasm of the arteries does occur, and some of the phenomena in so-called pernicious fever seem to be best explained on the view of this spasm extending to the vessels of the brain or other organs. Instances of this kind will be subsequently adduced. What occurs as the result of a poison in the blood may occur, no doubt, from irritation of sensory nerves.

The whole subject of paralysis from peripheral irritation is most ably dealt with by Dr. Weir Mitchell in a paper in the 'New York Med. Jour.,' Feb., 1866. While admitting that many of the cases recorded as reflex paralysis do not satisfy the claims of accurate criticism, he thinks it possible "that a very severe injury of a part may so exhaust the irritability of the nerve-centres as to give rise to loss of function, which might prove more or less permanent." He refers to some of his own experience in the effects of gunshot wounds as very convincing. Thus, a man "is shot in the right neck; he falls with palsy of both arms. The ball has passed out; it has hit no large bone on which it could split, so as to make in its after-course a double injury, and thus account for the loss of power in the left limb. The right arm traumatically palsied remains so for years, the left recovers spontaneously within a few weeks. Here the palsy is instantaneous, occupies a remote limb, and is to me inexplicable unless I admit that the impression made by the wound of the right cervical plexus was transmitted inwards to the spine, and gave rise to loss of power in those parts of the medulla which give origin to the left cervical plexus." Shortly after he adds, there is "little doubt in my mind that an injury of a nerve may give rise to sudden palsy of distant regions of the body." This is nearly the same view as I have held ever since my first paper on the subject in 1859, only that for the term "injury of a nerve" I use that of an impression operating injuriously upon a nerve. This has a wider significance, and takes in cases of less strongly marked features. An impression may operate injuriously—(1) Because it is positively excessive. (2) Because the recipient nerves and centres are too impressionable, and it is, therefore, relatively excessive. (3) Because it is actually pernicious in and of itself. It has not been sufficiently considered how much diversity exists between different kinds of stimulation, and how different their effects may be in different persons. Anne of Austria, who was no hysterical lady, and passionately loved flowers, fainted on inhaling the perfume of roses. The introduction of a catheter causes syncope in some persons, even when they are in health and vigour. A warm bath that recreates one person makes another faint. One person tolerates a tænia in his bowels very well, another, in like case, is so giddy he can hardly walk about.

The valuable work of M. Notta contains some very corroborative evidence as to the paralysing effect of *morbid* excitement (as in neuralgia) of sensory nerves. Out of 128 cases of neuralgia of the fifth pair, the optic nerve was paralysed in ten, the auditory enfeebled in four, the branch of the third nerve going to the levator palpebræ was paralysed in six, and the facial nerve in two. In a case of sciatica under my own care the detrusor urinæ was rendered very paretic, as well as the muscles of the affected leg, and both quickly recovered as the pain disappeared.

I cannot myself in the least doubt that the tendency of pain and of all unhealthy nerve excitement is to cause paralysis. In an average system this may be resisted for a long time, but will ultimately show itself in some part or other, either in sensory, motor, or vaso-motor nerves.

The essential idea of the inhibitory theory is that a peculiar kind of impression made on a centre may disorder or paralyse its action, may prove directly depressing. There seems to be ground for believing that such impressions may be generated within the cranial cavity as well as at the periphery. The crossed paralysis resulting from hæmorrhage into one hemisphere of the cerebellum seems only explicable on the view originally propounded by Mayo that the fibres of the transverse commissure coming from the diseased side communicate "a depressing" or "withering influence" to the descending fibres conducting voluntary motor impulses. Perhaps it may be more correct to regard all the fibres uniting together nervous centres as wholly commissural, and to consider the morbid influence in this case, therefore, as affecting the grey matter of the pons Varolii rather than the fibres, but this is only a slight modification of the original view. One circumstance which seems to support it is, that the crossed paralysis only occurs, according to Hillairet,[1] in about one third of all the cases; the reason being, that in the other two thirds the morbid impression is either insufficient to overcome the volitional impulse, or takes another direction, as to the corpora quadrigemina, causing blindness or convulsions, or to the medulla oblongata, impairing respiration or speech, or even to the lower part of the cord, producing predominating paraplegia. The non-occurrence of paralysis in some cases of disease of the cerebrum itself is probably to be explained in the same way. It is not the lesion of the hemisphere *per se* that causes the paralysis, but the depressing influence of this lesion on the deeper-seated cerebral ganglia. Paralysis, therefore, may or may not exist, according to the quality of the nervous power, or the peculiar kind of lesion. In certain instances, as Dr. Ogle[2] has pointed out, the morbid influence may take another route and act on the cerebral ganglia of the opposite side, so that the paralysis affects the limbs on the same side as the lesion. This view may afford some rational ground for treatment in cases which would otherwise be hopeless. It is true that we may be unable to amend materially the state of the damaged part, but we may be able so to improve the functional power of a connected centre that it shall not be depressed by the "withering" influence conveyed to it from the seat of the lesion.

---

[1] 'Ann. de Méd. et de Chir. pratiq.,' par Jamain, 1859, p. 39.

[2] 'Med.-Chir. Trans.,' vol. xlii.

(VI) It is, I think, a matter of certainty, that a nervous centre may be more or less completely paralyzed without having undergone organic change, in consequence of some enfeebling morbid influence, as the influenzal or malarious miasms, &c. Dr. Gull[1] has published a most interesting instance of complete paraplegia induced by sexual excess, in which nothing abnormal could be detected in the cord, even by careful microscopy. This was paralysis from simple exhaustion. Such paralysis may be distinguished as simple or neurolytic. I think it is certain that this does not depend on local anæmia; which adds to the probability that inhibitory paralysis does not necessarily either.

The febrile state affords a very strong argument in favour of this view. It can hardly be questioned that the sympathetic nervous system participates largely in the general prostration which is so capital a feature of fever. Yet in certain instances of pneumonia and of typhus, the rapid defervescence coinciding with general improvement, proves how speedily the vaso-motor nerve-centres may regain their lost power. One day there may be every sign of their being utterly paretic, the next they have to all appearance resumed their normal tone. It is impossible that the paresis can have depended on any actual lesion of their structure. The same remarks apply, perhaps even more forcibly, to the events in an ague paroxysm. In the following pages we shall repeatedly have to notice instances of this primary functional paralysis.

(VII) Anatomically regarded, it is very remarkable how closely the different nervous centres, or parts of a nervous centre, are connected by commissural fibres; and from a pathological point of view the same connection is often very manifest. The general exhaustion induced by excess in venery or by mental or bodily fatigue, the reproduction of neuralgia in weakly persons by bodily exercise, the effect of muscular exertion in producing drowsiness, are examples which show how excessive consumption of the nerve-force in one part weakens it also in others; and this can only be adequately explained by the intimate commissural connection between the various centres. Tetanus is a good instance of the diffusion of a state of excitement from one part of the cord throughout its whole extent. While, however, the connection of the several nervous centres is an important fact, their separateness and independence is also often clearly displayed. The cause of disorder which tells severely on one sometimes passes by all the others; and in different individuals different centres will not unfrequently be affected by the operation of the same agent. Thus a toxic dose of quinine will make one person blind, another deaf, and in a third will cause grave derangement of the action of the heart. A gravid uterus will give rise to severe frontal neuralgia, to intense gastric hyperæsthesia, chorea, hemiplegia, paraplegia, deafness, amaurosis, cerebral torpor, or actual insanity, in different persons according as one or other nerve-centre is most prone to suffer. The rule seems to hold in the microcosm as well as in the macrocosm that the weakest goes to the wall. If, however, all are weak alike, all may suffer alike, and it may be stated generally that according to the degree in which debility of individual centres exists will be the development of special symptoms.

---

[1] 'Guy's Hospital Reports,' 1858, Case xvii.

(VIII) The remarkable influence of the nervous system over the blood-vessels requires some particular notice. Our knowledge on this head has been chiefly the result of Bernard's labours; and it is difficult to over-estimate the importance of the study of these phenomena to every physician who desires either to comprehend aright the varying and manifold phases of disease, or to attempt the control of morbid actions by remedies in a rational and satisfactory manner. It is well known that in paralysis from disease of the brain or spinal cord, the temperature of the paralysed parts, as a rule, is lowered. This was found to occur when the anterior or posterior roots of the spinal nerves, or the root of the fifth pair, or that of the facial, were divided. The loss was not very considerable, varying from about 3° to 7° F. When the sympathetic nerve in the neck was divided, or the superior cervical ganglion extirpated, the following phenomena were observed:—The temperature of the operated side increased rapidly, and in a quarter of an hour had risen 11° F.; the arteries and small vessels dilated, and became much more full of blood than those of the opposite side; the pupil contracted, as well as the palpebral opening; while the globe of the eye appeared depressed in the orbit. The hyperæmia, which is the immediate result of the operation, subsides considerably in a day or two; but the elevation of the temperature is much more persistent, lasting in rabbits 16 to 18 days; in dogs, 6 weeks to 2 months. Not only the superficial parts, but the deep-seated, and even the blood returning by the jugular vein, can be shown to be hotter than the corresponding parts of the healthy side, or than they themselves were previously. It is an important circumstance, observed by Bernard and Brown Séquard, that the temperature on the sound side falls below its previous figure, the difference in one experiment amounting to 5½° F. The phenomena now described are more prominently marked in healthy and vigorous animals than in those that are weakly, and in those that are digesting food than in those that are fasting. When an animal whose cervical sympathetic has been divided on one side is exposed to a temperature above that of its own body, the side where the nerve is entire gains heat, while the other remains almost unchanged; and, before long, no difference can be detected between them. On the other hand, when an animal similarly circumstanced is placed in a medium considerably colder than its own body, the difference between the normal and the operated side becomes more prominently marked. The former loses heat much faster than the latter, and the thermometer shows it may become as much as 21° F. colder than its fellow. If the upper end of the divided sympathetic is galvanized, all the effects produced by the previous operation disappear, and are replaced by their converse. The pupil dilates, as well as the palpebral opening, and the eyeball projects from the orbit. Instead of being active, the circulation becomes weak; the conjunctivæ, nostrils, and ears, which were red, become pale. The temperature falls below the normal figure, while, curiously enough, that of the opposite side increases notably. According to Brown-Séquard, the effects produced by a transverse lateral section of the semi-cord in the dorsal region, on the posterior limb of the same side, are exactly similar to those we have been considering. The condition also of the opposite sides in both cases is quite similar: "both receive less blood than usual, their temperature diminishes, their nutrition is less active, and their vital properties also diminish." By recent investigations, Bernard has found that there are two sets of nerves in the cervical sympathetic—one oculo-pupillary, arising in the dog from the anterior roots of the two first dorsal; and the other vascular and calorific, arising from the sympathetic ganglia. He also states that division of the anterior and posterior roots of the nerves proceeding to the posterior extremity in dogs causes paralysis of motion and sensation, but no change of temperature or vascularity. Division of the sciatic nerve, however, raises the temperature 6° to 8° C. (11° to 14° F.), and increases the vascularity. Division of the sympathetic nerves has the same effect, but causes no paralysis. Bernard's observations thus go to attribute more importance to the proper fibres of the sympathetic system than to those which it receives from the spinal nerves in controlling the local circulation. They demonstate, certainly, the partial independence of the sympathetic system. Bernard remarks, that though he has watched for a length of time animals who had undergone division of the cervical sympathetic, he has never seen any œdema or inflammatory action supervene in the abnormally hot parts so long as the animals continued in good health; but if they fell sick, either spontaneously or from the effects of other operations, the mucous membranes of the eye and nose on the operated side *only* became very red, swelled, and poured out purulent matter abundantly. If the animal's health improved, these inflammatory phenomena ceased. This highly important observation I can quite confirm from my own experience. A cat on which I operated had severe purulent ophthalmia of the left eye for five or six days; after which it spontaneously declined. Sixteen days after the operation, the left ear was 15° F. hotter than the right. She has been debilitated by an unsuccessful attempt to divide the renal nerves on one side. The destructive inflammation which assails the lung, when the nerves at its root have been involved in some tumour disorganising their texture, may also be cited as an instance in proof. So may certain cases of remittent ophthalmia giving way to quinine, or of pemphigoid bullæ appearing in connection with a marked liability to vaso-motor paralysis, especially when the disease is cured as it often is by arsenic.

Dr. Scott Alison ('Lancet,' 1846, vol. i, p. 278) relates cases of arthritis occurring in connexion with hemiplegia. A lady, æt. 49, who had long enjoyed perfect health, and never suffered from any form of arthritic disease, was suddenly seized with hemiplegia. A few days after swelling and increase of temperature of the wrist of the paralysed side were observed, and soon after the knee and foot of the same side swelled and became somewhat painful. There was no œdema; the paralysed limbs were slightly rigid. After death the brain was found in a softened condition, and the pelvis of the kidney of the affected side was full of small calculi of lithic acid. He also related two cases in which the inflammatory red line of the gums following the use of mercury, in paralysis of one side of the face, was strictly confined to the paralysed side of the mouth. The paralysed parts, he stated, were in fact more delicate tests of poisons in the blood than parts in a state of health. I may also refer to a case of acute rheumatism under my care, where the arteries were most remarkably toneless, and there was a copious red spotty eruption with sudamina on the trunk; many of the sudamina or red spots developed into true cutaneous abscesses. The parts were poulticed, but the inflammatory spots appeared before the poultices were applied. I cannot doubt that arterial relaxation was the main factor of the eruption and inflammations.

Injuries to the human frame serve sometimes the same purpose as experiments on animals. The following observations of Mr. Hutchinson seem to me to have an interesting bearing on the subject before us. He says, "I have used the term 'paralytic pyrexia' to denote the state of feverishness which is so marked a feature in the stage of reaction after severe injuries to the head. Throbbing relaxed arteries and great heat of skin are its chief features, but in greater or less degree the other constitutional symptoms usually included in the term pyrexia are present—a furred tongue, dryish mouth, distaste for food, with thirst and scanty urine. Disturbance of the circulation and enlarged calibre of blood-vessels, are, however, its chief symptoms; and these we explain by supposing that the shock to the cerebral centres has caused a partial and temporary paralysis of the vaso-motor nerves. In cases of concussion of the brain the whole of the system of blood-vessels is implicated; in cases of injury to the spinal cord, however, we have a similar state of things as far as the vessels are concerned, but it is only local, and involves, of course, only the parts below the seat of injury. After injury to the lower dorsal and lumbar region we usually find the lower extremities pungently hot and the skin feeling dry and harsh; the tibial arteries are felt with unusual ease since they are large and throbbing." Taking the average temperature of the feet in twenty persons, from Dr. Woodman's observations, as 81°·5 in the cleft between the great and second toe, the extremes being 70° and 94°, Mr. Hutchinson tells us that he found in one man who had fracture in the dorsal region, on the second day, a temperature of 101° in the inner ankles of both feet. In a boy with fracture in the lumbar region the temperature in the first cleft of the toes was 100° in the fourth week after the accident; the day before the same foot had marked 78°; the other foot had varied in an almost equal degree. These cases of elevation of temperature from injury affecting the nervous centres are the more conclusive because there is no question of a miasm deranging nutrition to complicate the matter.

The cause of the elevated temperature of the parts lying in the range of the divided sympathetic is attributed by Brown-Séquard and Waller to the increased afflux of blood, to the local hyperæmia. Bernard, however, opposes this view, because the temperature does not vary when the hyperæmia declines; because hyperæmia occurs when the fifth nerve is divided, but is attended with diminished temperature; and because ligature of the veins of each ear, and consequent gorging of the vessels with blood, lowers the temperature of the parts, which again rises on the side on which the sympathetic is subsequently divided. It is true, that if the carotid be tied, and the sympathetic afterwards divided on the same side, no calorification takes place; but if the sympathetic be first divided, and calorification have come on, ligature of the carotid does not lower the temperature to that of the sound side. Another argument which may be used, in support of Bernard's opinion, is that the temperature in the paralysed parts exceeds, in some cases, by 2° or 3° the normal temperature of internal parts, as the rectum. On the whole, it seems to me decidedly most probable that the increase of heat is not solely due to hyperæmic afflux, but that accelerated tissue change also plays a considerable part in its causation. It is a very important point, which is well illustrated by Brown-Séquard,[1] that the vital properties of the tissues in the range of the divided sympathetic are increased. He states that sensibility is augmented, and persists longer; the sense of hearing seems to be more acute; the secretions of cerumen, tears, and perspiration are increased, chloroform anæsthesia occurs later in these parts than in others, the first convulsions in strychnia poisoning take place there; a galvanic current too weak to act on the other side produces contractions there; after death, the muscles and the iris remain contractile longer than usual; the galvanic current of the muscles, detected with the galvanoscopic frog, is stronger than in those of the other side; cadaveric rigidity comes later and lasts longer, and putrefaction ensues later. Bernard doubts that the effect of dividing the sympathetic is to paralyze the arteries, and so cause their dilatation: he seems to regard it as an anomaly that arterial paralysis should promote greater activity of the circulation. This, however, seems only natural, when we reflect that arterial contraction would necessarily have the opposite effect, and would diminish the afflux of blood to the part. This is well seen when the arteries in the frog's web are made to contract by the application of cold; whole tracts of capillaries appear empty, and deprived of red corpuscles. On warming the web, the arteries immediately pour in blood abundantly. The old and oft-used phrase, "great arterial action," descriptive of a large and bounding pulse, when translated into correct physiological language means, of course, great *cardiac* action with *a want* of arterial. Some recent observations by Bernard,[1] show very clearly how paralysis of the sympathetic nerves increases and accelerates the arterial current. When a manometer was inserted into the right coronary artery of the lip of a horse, and another into the left, both instruments showed a pressure of 160 to 180 millim. The pressure of the blood increased 40 millim. on the left side after division of the corresponding cervical sympathetic. In the coronary veins of the lip, the instrument showed a pressure of 30 to 40 millim., which increased to 50 or 60 after section of the sympathetic, while the pressure again fell 20 millim. when the nerve was galvanized. As other results of division of the same nerve, were noticed pulsation of the veins, and a brighter colour of the venous blood.

---

[1] 'Phys. of Central Nervous System,' p. 141.

Analogous experiments made by other observers strongly corroborate Bernard's statements. Ackermann and Bergson made an opening in the skull of rabbits, removing a portion of bone and of the corresponding dura mater, and closing the aperture with a glass plate and collodion. They were thus enabled to observe the varying state of the vessels of the brain. Section of the right cervical nerve was found to cause injection of the diploë, and of the cerebrum on that side; and three hours afterwards, when the left nerve was divided, the injection of the corresponding cerebral hemisphere became equal to that of the right side. ('Syd. Soc. Year-Book,' 1860, p. 131. 'Virchow's Arch.,' vol. xv, p. 401.) Jaschkowitz shows that section of the sympathetic plexus of the splenic artery causes congestion of blood, softening and distension of the capsule. If part only of the plexus is divided, the corresponding part only of the spleen is affected. Samuel, in experiments upon rabbits, dogs, and cats, found that the hyperæmia of the intestinal mucous membrane produced by the extirpation of the cœliac plexus was so great that it exceeded all pathological hyperæmias hitherto known. The secretion of the mucous membrane is increased by the operation, but not to the same degree as in violent diarrhœa. Wharton Jones finds that after removal of the lower part of the spinal cord and the roots of the nerves in a frog, the arteries of the webs retain all their contractility, or are even more than usually disposed to be constricted. If now the ischiatic nerve be divided on one side, "the result is, that the skin of the extremity subjected to the experiment becomes, even to the naked eye, redder from vascular congestion than that of the opposite extremity; and, on examination of the web under the microscope, the arteries are found considerably dilated. In the web of the opposite extremity, on the contrary, the arteries are seen still much contracted, some even to closure." "When the sympathetic nerve is divided on one side of a horse's neck, that side of the face and head appears bathed in sweat."—'Report of Vienna Hospital,' 1863. Schmidt, vol. cxxviii, p. 337. Instances have been observed in man where like results have ensued. A man cut his leg with a hay-knife; profuse bleeding ensued, and nearly proved fatal. Ever after he observes that the wounded leg is hot and moist, while the other is apt to be cold. A patient of my own cut the inner side of the index finger deeply; and after the wound had quite healed, I found the distal part of that finger 2° hotter than the corresponding part of the middle. Algide fever, where the surface is icy cold, affords an example of the opposite state.

---

[1] 'La Clin. Europ.,' 1859, No. 29, p. 282. 'Syd. Soc. Year-Book,' 1861, p. 29.

The above statements show in the clearest manner how considerable a control the sympathetic nerves accompanying the arteries have over the circulation, and the nutritive actions in a part. It is, therefore, certain that the influence of those vaso-motor nerves must rank very high in the pathology of all disorders attended with alterations of the circulation. But we have now to inquire whether these are the only nervous organs which act on the circulation, or whether there exist others also. The answer to this last question must be in the affirmative. Ludwig's and Bernard's experiments show convincingly that stimulation of the third division of the fifth pair and of the facial produces a greatly increased flow of saliva, while at the same time the circulation in the gland is accelerated. Pflüger's observations on the structure of the salivary glands go to show that their nerves are directly connected with the gland cells themselves; and Wittich's experiments on the parotid are confirmatory of this view, as he finds that stimulation of its nerves causes the gland to secrete even when the flow of blood to it is arrested (v. 'Syd. Soc. Year-Book,' 1865-66, p. 14). Some of the later observations of Bernard prove that in the submaxillary gland at any rate paralysis of the vaso-motor nerves conditionates secretion, which may go on continuously for five or six weeks if the nerves are completely destroyed. When a flow of saliva is excited by the application of vinegar, &c., to the tongue he believes that a reflex paralysing influence is propagated from the gustatory on to the vaso-motor nerves, which normally keep the vessels in a state of tonic contraction ('J. de l'Anat. et Phys.,' 1864, p. 307). It is very probable that gland stimulation may be effected in both ways, sometimes the secreting cells being directly aroused by nerve influence and attracting more blood to their capillaries, sometimes the arterial dilatation and consequent hyperæmia constituting the first event. As demand produces supply, so supply may produce demand. It is not known so certainly whether this is the case with other glands; but with regard to muscles it seems sufficiently evident that their voluntary exercise coincides with increased blood-flow. The darker colour, increased bulk, firmness, and strength of a muscle that has been well exercised, contrasted with the paleness, flaccidity, and wasted condition of one that has been long unused, can be accounted for in no other way than by admitting that the former has received a much larger supply of blood. If any further evidence were required, it would be found in the observations of Becquerel and Breschet as to the increase of temperature which is produced by muscular exercise, amounting sometimes to 2° F. The phenomenon of erection of the penis is, beyond doubt, dependent on a state of active innervation of the part, causing increased afflux of blood. At certain times its occurrence can be perceived to be distinctly voluntary, and can be induced or prevented at the will of the individual. Samuel[1] contends for the existence of fibres, distinct from the motor of muscles and vessels, as well as from the sensory, whose office is to

---

[1] 'Die trophische Nerven,' Leipzig, Wigand, 1860. 'Canst. Jahresb.,' vol. ii, p. 53—57, 1861.

SCHOOL OF

preside over nutrition, and which are divisible into a centrifugal and centripetal set. The former when excited increase nutrition, when paralyzed decrease it. Paralysis of the centripetal fibres Samuel regards as the cause of the diminished resisting power of anæsthetic parts to injuries, &c. Fever and inflammation he explains as states of excitement of the trophic nerves. He records various experiments in which irritation of sensory and of compound nerves caused intense inflammation of the parts to which they were distributed. These, however, do not seem to have been by any means unexceptionable, and have been strongly controverted by Weber, who concludes that the influence of nerves upon inflammation is nothing else but the influence exercised by them upon the blood-vessels, and that inflammation cannot be directly caused either by paralysis or irritation of nerves. From the general tenor of these statements I think we cannot doubt that certain nerves, when stimulated, do exert a very considerable influence in the districts to which they are distributed, in the way of increasing the amount of blood circulating through the tissues. Herein they exactly antagonize the ordinary vaso-motor nerves accompanying the arteries, whose activity induces the opposite condition. For the present it must remain doubtful whether the so-called trophic nerves are indeed a special set, or whether the same effects may not be produced through ordinary motor and sensory nerves. The latter view seems the most probable, and is strongly corroborated by the atrophy of the hands and feet which occurs as the result of the anæsthesia of Indian leprosy.

On the whole, after comparing the teachings of science with our experiences in practice, I find that the theories of vaso-motor paralysis, of inhibitory action, and of the paralytic character of neuralgia, are of great value as affording a rational basis for treatment, and as combining together in an intelligible view numerous facts whose significance we might otherwise fail to perceive; but the doctrine of special trophic nerves seems to me at present to be but sparely applicable to the phenomena of disease. One of its supporters (Samuel) regards fever and inflammation as states of excitement of the trophic nerves, and atrophics as the reverse. Now certainly the view which Bernard's observations lead to as regards fever and inflammation is much more generally consonant with experience.

(IX) Some common facts of daily occurrence are worth considering in reference to the above doctrines. It seems that there exists a kind of alternation between the action of the vaso-motor and cerebro-spinal nerves, the period of activity of the one corresponding to that of quietude in the other. Thus, while we remain at rest, the temperature of the surface of the body generally, and especially that of the limbs, is decidedly lower than when we are in active exercise, and the cutaneous blood-vessels are comparatively contracted and small. This condition, when it is somewhat excessive, produces the cold hands and feet from which not a few persons suffer. On the other hand, there are instances, though less frequent, where the reverse seems to be the case, and the hands and feet are prone to be hot and bedewed with excess of secretion. In the former it is clear that the cutaneous arteries are habitually contracted, in the latter relaxed. Now, it is certainly remarkable that voluntary exercise of the muscles should so speedily affect the distribution of blood to the cutaneous surface. We might have expected that it would have caused an increased flow to the muscles, according to the function assigned to the trophic nerves; but we should scarcely have surmised *à priori* that an active state of the musculo-motor would coincide with a paretic of the vaso-motor nerves of the integument of the same limb. The fact, however, is unquestionable, and it is worth inquiring how it comes to pass. There seems no other explanation than that the *vis nervosa* of the centres, which while the muscles are at rest can act only on the vaso-motor nerves, is withdrawn from the latter to a great extent when these great organs are put into action, and, consequently, the cutaneous and other arteries become dilated and permit free access to the blood. That this is really the case is tolerably clear, I think, from the circumstance that not only the vessels of the integument of the working muscles are relaxed, but those also of distant parts, as the head, which are not specially active. A rower, or a pedestrian wending his way up a mountain pass, finds the toil-drops fall thick and fast from his brow, though his brain is far less active than it was when he was engaged in his study. The influence of cold also goes far to prove that the relation of the phenomena to each other is such as I have suggested, It is certain that in cold weather we are capable of much more muscular exertion than in hot. On a cold day we can walk briskly with a weight of clothing which would be intolerable on a warm: the cold evidently increases our muscular force. At the same time, we find that our limbs do not warm nearly so readily, though they may be well wrapped up, and sensible perspiration is with difficulty induced. This is because the greater amount of *vis nervosa* not being so soon expended on the voluntary muscles, keeps the arteries longer contracted. Again, it is well known that horses who are in good training will do their work with much less sweating than those who are out of condition. Patients suffering with neurolytic disorder often complain that the least exertion causes them to break out into perspiration, while as they improve this tendency diminishes. Here, again, we see a positive relation between nerve-power and vascular dilatation. The increased secretion from the cutaneous surface may be reasonably supposed in a state of health to be the result of an increased supply of blood to the perspiratory glands, and we have already seen that such has actually been found to result from the hyperæmia induced by dividing the vaso-motor nerves. We may, therefore, I think, fairly surmise that what takes place on the cutaneous expansion and glands takes place also in internal lining membranes and glands, and that thus, by means of the free flow of blood to all parts, the general nutrition is more perfectly carried on.

One chief cause of arterial dilatation, when the muscular coat is relaxed, is of course the pressure of the column of blood driven by the heart. Now, during exercise, the action of the heart is increased; and it is interesting to inquire how this occurs. Moleschott's experiments show that a weak stimulus applied to the vagi increases the frequency of the pulse; yet it is also almost the universal testimony of all observers that division of these nerves greatly accelerates it. Dr. Sanderson writes respecting the condition of the heart and circulation after section of the vagi, "The arterial tracings obtained indicate extreme abbreviation of the diastolic period, combined with high arterial tension. The contractions of the heart follow each other so rapidly that the organ is in a state of continuous thrill, while, at the same time, they are sufficiently vigorous to maintain an arterial pressure several inches higher than the normal." ('Philos. Trans.,' p. 571, 1868.) In one experiment of my own, the rate was nearly doubled. It seems, therefore, that paresis of the vagi may be looked upon as a probable cause of acceleration of the heart's action during exercise; and this paresis would be produced in the same way as that of the arterial nerves. Moleschott asserts that the sympathetic has the same influence on the heart as the vagus, so that all the cardiac nerves would be affected in the same way. Moreover, paresis of the coronary plexuses would have the effect of admitting a larger supply of blood through these arteries to the muscular tissue of the heart. This would certainly favour, if it did not set up, increased action of the organ. There exists evidence to show that heat has a stimulating effect on the movements of the heart; and it is probable that the increased temperature of the blood in febrile states is concerned in causing the rapid pulse. But the acceleration of the heart's movements by muscular exertion ensues too rapidly to be ascribable in any great degree to this cause. In feeble persons, palpitation and quickening of the pulse on any slight muscular effort are familiar occurrences; and it may be said generally, that the greater the debility, the more readily does the change in the cardiac rhythm occur. A female, æt. 20, recently under my care at St. Mary's Hospital for very marked anæmia, had while lying on the bed a pulse of 78, of apparently good size and force. I desired her to rise and walk to a chair in the ward which was five or six yards off. She did so with a feeble tottering gait, and on reaching the chair sank down upon it sobbing and panting for breath. Her pulse was then 160, more than double what it had been a minute or so before. Subsequently, when she had improved a good deal, and her face was better coloured, she performed the same distance on two occasions without any disturbance of breathing, and with much less acceleration of the pulse. On one trial it was 78 before, 103 after. On the second it was 84 before, and 117 after. The pulse of a healthy youth before similar slight exertion was 76, immediately after 84. These results are quite sufficient to prove how large a share nerve-paresis has in quickening the action of the heart. Were the result produced solely by the arrival of a larger quantity of blood in a given time at the heart, in consequence of the pressure exerted on the veins by the acting muscles, the acceleration of the heart's action would surely be less in the anæmic than in the normal state. As the reverse is the case I cannot doubt that the innervation of the heart is the more important factor of the two. There can be little question that the two phenomena above alluded to are really related to each other, and it is difficult to see any more probable connection between them than that which I have suggested. It is evidently in accordance with the plan of the circulation that dilatation of the arteries should concur with increased action of the heart. If the reverse was the case, we should have the heart's energy wasted in endeavouring to overcome the undue resistance of the vessels. As it is, however, the central impelling organ puts forth its activity at the time when it can be really effective. Some of the phenomena of disease accord remarkably with the above views. The rapidly-acting heart of the patient prostrated by low fever is often greatly quieted by wine, at the same time that the temperature is reduced. The quick, feeble, irregular pulse of cardiac dilatation is sometimes made steadier, slower, and stronger by digitalis, acting as a cardiac stimulant. The degree of acceleration of the pulse produced by sitting up in bed is a good indication of the extent to which a patient is exhausted by fever, or any other asthenic disease.[1] In the affection termed "goître exophthalmique," the heart's action is often remarkably excited, the carotid and thyroid arteries uncontracted, while the general condition is mostly one of great, perhaps extreme, debility.

We have glanced at the effects of exercise as a cause of nerve-paresis on the heart and arteries, let us now look at those of two other influences which are among the most common and potent, and which we shall do well to study thoughtfully. I refer to cold and heat. One of these may be taken as a type to a great extent of nerve-toners, the other of nerve-relaxants.

The application of cold to the cutaneous surface exerts, as is well known, a striking influence on its contractile tissue, producing the so-called goose-flesh. This is not (at least necessarily) the result of direct stimulus, as it is equally produced when the cold is applied to another part of the surface. Thus, a cold wet towel flapped on the back immediately causes contraction of the cutaneous muscles on the anterior part of the trunk, which, of course, can only take place in a reflex manner, the stimulus of the cold to the sensory nerves being reflected on the vaso-motor, and those which influence the cutaneous fibres. This contraction, it may be remarked, is precisely the same to all appearance as that which results from direct stimulation of the tissue by the interrupted current. It seems highly probable that the same contraction of organic muscular fibre takes place in internal parts when cold affusion is applied to the surface, since there is no reason why we should suppose the stimulant impression to be reflected on the nerves of the skin alone. Indeed, there is actual proof that such is the case; for we know certainly that hæmorrhage from the uterus, from the lungs, and from the nasal cavities, may be arrested by the application of ice to the surface. Dr. Brinton remarks ('Dis. of the Stomach,'

---

[1] Graves, 'Dublin Hospital Reports,' 1830, v, p. 469.

2nd edit., p. 167, note): "How efficiently the stomach itself may be cooled by ice applied to the epigastrium, is illustrated by a converse fact, namely, that an enema of cold water at 45° Fahr. soon lowers the temperature of the anterior wall of the belly by 3° or 4°. The good effects of more moderate cold repeatedly employed are familiar to most practitioners, but for completeness of assurance I may quote some authorities. "In my own experience," says Dr. Forbes, "the effect of sponging the chest with cold water and vinegar once or twice a day has proved of immense benefit to delicate subjects, and more especially to those liable to catarrhal affections, and to persons decidedly phthisical." ('Translat. of Laennec,' 3rd edit., p. 98.) Dr. Tyler Smith writes ('Pathol. and Treatment of Leucorrh.,' p. 210): "Cold bathing not only affects the lower part of the vagina with which the water comes in contact, but by a reflex action contracts the uterus itself, even in the unimpregnated state. I have no doubt that if cold or tepid hip bathing were more common and habitual than it is leucorrhœa would be much less frequent." In the severe dry cold of a Canadian winter I have heard on good authority that chest affections, as tested by the amount of coughing at church, are much less frequent than they are at the same season in England." Mr. Carvalho describes his experience of the beneficial action of cold as follows: "The Grand river (eastern fork of the Colorado) had to be crossed by swimming the cold flood, and by scrambling and leaping over blocks of ice. In spite of every such incident, of beds on the snow under the open heaven, and exposure to extreme severity of frost, snowstorms, and once a deluge of rain all night long, throughout this journey I never took the slightest cold, either in my head or chest; I do not recollect even sneezing. While at home I ever was most susceptible to cold." ('Household Words,' March, 1867, p. 263.) Catarrhal affections, it has been often observed, do not occur during the continuance of sharp frost, but as soon as a thaw sets in they become rife.

The above testimonies, to which many more might easily be added, seem to me to establish the point that cold acting principally as it must on the cutaneous nerves very frequently produces or maintains a due contraction of the vaso-motor nerves of internal organs.

It seems highly probable that this tonic action of cold is not confined to the sympathetic nerves, but affects various others.

There can be no question, from Vierordt's observations, that it acts on the inspiratory nerves, and just as little that the muscular nerves generally are braced and toned by it. That the vagi nerves feel its influence seems fairly deducible from the fact that the heart's action is notably influenced by the cold shower-bath. Dr. Sieveking states that when the bath was taken after the pulse had been increased by exercise, the average depression in twenty observations amounted to 8·05 beats. When the bath was taken immediately after rising, the average depression in thirty observations was 6·14, and this was not counteracted by subsequent exercise, which only increased the pulse on an average by 3·21 beats. These results were obtained upon a person in good health, and in whom sufficient reaction occurred; but it is probable that in a less vigorous subject the depression would have been still greater. Dr. Bence Jones's observations as to the effect of prolonged cold affusion show that it has a most powerful sedative effect on the heart, reducing the pulse thirty to fifty beats in a minute, and often rendering it quite imperceptible. When the water was cooled down to 50° Fahr., the effect was much more rapid. This slowing of the pulse and weakening of the heart's action can scarcely be referred to any more probable cause than reflex stimulation of the vagi, which produces exactly these effects. At the same time, it is tolerably certain that the systemic arteries throughout the body are more or less contracted, so that the blood-flow is impeded at the same time that its *vis à tergo* is diminished. When the cold bath agrees, the action just described on the heart and arteries lasts for a very brief time, and is succeeded by the opposite condition, in which the comparatively paretic vagi and vaso-motor nerves allow increased cardiac action, and free arterial blood-flow. The increased action of the heart is, of course, favoured by the more free supply of blood it receives through its own dilated arteries. There is nothing surprising in the change in the state of the nerves just alluded to; it is a matter of general experience that sudden excitement of nerve-tissue is apt to be succeeded by more or less of torpor. When reaction is imperfect the vagi and vaso-motor nerves, or more properly their centres, remain excited, the heart's action continues depressed, and the arteries generally contracted, so that free flow of the blood current is prevented. This result may depend on hyperæsthesia of the nerves concerned, a state which, as we shall presently see, is closely connected with debility. The correctness of the above *rationale* of events seems to be strongly affirmed by the results of thoroughly heating the body before exposing it to the cold. Drs. Bence Jones and Dickinson have recorded some very interesting observations relative to the effect of a very hot vapour-bath taken just before the cold douche. They found that the increased action of the pulse produced, by subjecting the body for some time to the influence of hot steam, prevented that depression which would otherwise have been occasioned by the cold water (v. 'Proc. of Med. Chir. Soc.,' vol. i, p. 77). The action of heat is certainly relaxing to the nerves and muscles of the skin and the arteries; so that it is quite intelligible how it may obviate the over-stimulating effects of the cold,—rendering both the coronary arteries of the heart, as well as those of the body generally, less prone to constriction. Empirical observation had shown long before, in the Russian vapour-baths, the perfect safety of copious cold douching or rolling in the snow after somewhat prolonged exposure to a heat varying from 122° to 167°; and it was inferred by Dr. Currie from observations of his own that the safety as well as the agreeableness of the practice depends on the heat of the bather's body being increased above the natural standard before the action of the cold is encountered. Possibly this cause is operative as well, but I believe most importance is to be assigned to the state of the nervous system.

Admitting, however, the above views, there seems nevertheless quite sufficient ground for believing that imperfect reaction after exposure to cold does not depend solely, at least in all instances, on prolonged excitement of the vagi and vaso-motor nerves. To a varying degree, and especially in some of its graver forms, inhibitory paralysis of the cardiac ganglia and spinal centres appears to be the more efficient causative condition. To this subject we shall return under the head of cardiac neuroses.

We have next to consider the effects of heat, which we have already seen to be antagonistic to those of cold. The largest experience testifies to its enfeebling influence on the musculo-motor and vaso-motor nerves. Few men would be able to undergo the exertion at a temperature of 90° which they could with ease at 50°. The difference in the fulness of our vessels, according as the parts to which they belong are warm or cold, is familiar to the commonest observation, and the microscope shows us definitely in the frog's web how the arterial channels are expanded by warmth and con-

---

[1] Vid. 'Proc. Med. Chir. Soc.,' vol. i, p. 77; 1857.

tracted by cold. Not only the superficial vessels, but those of internal organs, are affected in this way. Drs. Bucknill and Tuke write, "this form of bath (the Turkish) is certainly liable to produce cerebral congestion and cephalalgia in the sane," and I have certainly heard of cases which bear out this statement. Delirium and determination of blood to the head are by no means impossible occurrences where this often unquestionably useful remedy has been injudiciously resorted to. The great heats of summer, which powerfully promote the flow of blood to the outer tegument, decidedly favour the occurrence of hyperæmia of the internal, as we must conclude from the great liability to diarrhœa at such times. The flow of bile is often so much excited by heat that a special cutaneo-hepatic sympathy has been thought to exist; it seems very doubtful, however, whether this is anything more than a part of the general effect which we are considering. The vessels of another internal organ, the uterus, are notably relaxed by tropical heat; Sir R. Martin mentions "the frequency of uterine hæmorrhage in females who have been long in India" (p. 640). Not only the vessels, but the heart itself feels the enfeebling influence. Syncope (even fatal) has not rarely been produced by the hot bath, and is not uncommon in all places where heat is felt to be oppressive. In a certain number of cases of heat-apoplexy (so-called) death occurs in the way of syncope. Sir B. Brodie confined a rabbit in an oven at 150° for a few minutes, at the end of which time it died without any apparent suffering. The heart was found distended with blood on both sides, as after death by asthenia.

The *modus operandi* of heat in causing relaxation of nerve and muscle of internal organs is, I believe, the exact converse of that of cold when it produces contraction. As the latter cannot be supposed to act directly, or through the intermedium of the blood or internal parts, but rather reflexly through the nerves, so is it with the former. The well-known experiment of Brown-Séquard and Tholozan proves that cold acting on the sensory nerves of one hand or foot causes considerable lowering of the temperature of the other. I have found that a corresponding but opposite effect is produced by heat. If the temperature of one hand be taken and the other then immersed in water at about 108°, the mercury falls at first about 1° F., then as the water cools to 98° it rises again 2° F. from the starting-point. The *hot* water stimulates the sensory nerves of one hand, and through them the vaso-motor of the opposite; the *warm* water relaxes the sensory, and through them the opposite vaso-motor. Some of our common experience is consonant with this view of reflex relaxation. Thus, the calmative effect of a tepid bath on an excited brain, the relaxing effect of a warm bath on a spasmodic stricture, or its still more enfeebling operation on the heart, seem to admit of no other explanation than that which I have suggested. The acceleration of the pulse observed by Blagden in hot dry air, and by Constantin James in hot moist air, very probably may be referred to paresis of the vagi; while the syncopal operation of heat, like the inhibitory arrest of the heart produced by cold, may depend upon the impressions being conveyed to the spinal centres and cardiac ganglia.

The occurrence of copious perspiration we have already seen to be one of the results of paralysis of the sympathetic, and to be a common attendant upon general nerve debility. Taking it as a sign of nerve paresis, we may consider now the bearing of some other phenomena. Rapou ('Traité de la Methode fumigatoire,' vol. i, p. 65) states that when a person is immersed only up to his middle in hot air the perspiration breaks out equally over all the parts of his body, and even sometimes more promptly on those which are not exposed to the heat, if only they are carefully kept from the air. Mr. Green describes the effect of the hot air-bath, when the head is not enclosed, as follows:—The countenance looks florid, and then flushed; the pulse rises in frequency and gains much in fulness, but is soft; the whole body, the face as well as the other parts, next become bathed in perspiration, so that the sweat is seen standing in beads upon the forehead and trickling down the cheeks. I have observed myself the temporal arteries beating forcibly during a patient's immersion in the sulphur-fume-bath. Rapou affirms that in general vapour-baths at 80° F. to 104° F. the muscles lose immediately their energy, so that the bather is unable to grasp a small object forcibly. A patient of my own found that a simple lamp-bath produced considerable tremor of the muscles and great debility, with copious perspiration; the tremor ceased as soon as he left the bath. He was syphilitic, and first experienced the tremor while using the calomel-vapour-bath, but the effect was the same when the calomel was omitted. A medical friend who had hemiplegia, undoubtedly from cerebral disease, told me that when taking a hot air-bath he perspired very much more on the palsied side than on the other.

From these facts we may infer with much probability—(1) that heat applied to the surface, excluding the head, enfeebles the muscular nerves; (2) that it acts in the same way on the vaso-motor nerves; (3) that its effects are greatest where the nerve power is low; (4) that it acts on parts to which it is not applied directly in a reflex way, on the internal as well as on the external.

It must always be remembered that the effects of heat and cold are not constant, but vary according to the peculiarities of the individual system. For example, a friend of mine finds that he can walk pretty easily twenty-five miles a day in September, but cannot accomplish nearly as much in severe cold weather. Probably his motor-nerve centres are too impressionable by cold, or his vaso-motors too excitable, and keep his arteries contracted too much. The same enfeeblement of circulation gives rise to chilblains in many people. Another striking instance of individual peculiarity is the following:—Two youths were accustomed to go out shooting together in Canada in the winter. The hands of one were so warm that he always went without gloves, while the other was obliged to have his thickly covered. What a difference there must have been in the excitability of the vaso-motor nerves in these two individuals.

(X) The relation which the febrile state bears to disorder of the nervous system is a topic of high interest. It did not escape the notice of Hippocrates, as shown by his aphorism, Πυρετος λυει σπασμους. The essential phenomena of fever seem to be increased temperature, more or less prostration, and derangement of the nervous functions; disorder of the secretions, and impairment of nutrition generally. The intention of the following remarks is not, of course, to notice any particular kind of fever, but to endeavour to trace the extent in which the phenomena of fever in general can be explained in reference to neuro-pathology. Debility of the cerebro-spinal system does not seem, *per se*, capable of producing fever. We see patients continually who are extremely weak, with a small and languid pulse, yet quite without fever. On the other hand, mere exhaustion from muscular exercise does seem sometimes to set up fever. I know myself two individuals in whom this has occurred. Again, all the phenomena of the earlier periods of fever are indicative of depression; and in the prevailing fevers of our day, the stamp of debility is apparent throughout. There is much in the facts above stated as to the influence of the vaso-motor nerves to suggest that paralysis or weakening of their power may be an essential condition in fever. If we suppose the effects produced by dividing the sympathetic in the neck to be general, to occur all over the body—which is quite conceivable—there would ensue general pyrexia. In fact, we are sure that elevation of temperature and relaxation of arteries cannot exist with any other than a paretic condition of the sympathetic. Taking first for consideration the ordinary low or asthenic fevers, with which we are familiar, let us see how far we can account for their phenomena on the assumption that the poisonous miasma has weakened the vaso-motor system, as well as all the others. The increased temperature—the quick, but soft and weak pulse—the hyperæmias of various viscera, may all, according to the foregoing views, be regarded as natural results. The increased secretion of urea may be accounted for partly by the augmented chemical changes which take place in the mass of the blood (considered for the time as a solid tissue) uncontrolled by the sympathetic nerves, and partly by the increased amount of renal action, depending on the same cause.[1] The hypertrophy which affects the glandulæ solitariæ and agminatæ in typhoid may be also traced to the same nervous paresis, and may be regarded as analogous to the enlarged spleen of ague, or the goïtre of Swiss malaria. To regard this hypertrophy as an attempt at elimination seems to me quite a mistake. It is no more to be considered such than the enlargement of the correlated mesenteric glands is, which takes place at the same time. Both are similar structures, and both hypertrophy under the same conditions, viz. hyperæmia and loss of nerve influence. Even the thirst may be reasonably regarded as a paretic nerve phenomenon. The quenchless 'drouth' I have experienced in Swiss rambles seemed to me more dependent on exhaustion than on anything else. Brodie relates a case cured by quinine, and I have met with the symptom as an almost solitary effect of influenza. The condition of the other systems in low fever quite corroborates our assumption as to the condition of the sympathetic. The quiet muttering delirium, the unconsciousness or half consciousness, testify how the brain is enfeebled; while the down-sunken posture in bed and the subsultus reveal the extreme muscular debility. The feebleness of the heart's action and the softening of its texture prove how its vital energy is depressed. The readiness of the skin to slough shows how its

---

[1] Oppler has shown that the kidneys actually form a considerable proportion of the urea secreted. Virch. 'Archiv,' vol. xxi, part 3. 'Syd. Soc. Year-book,' p. 219; 1862.

SCHOOL

nutritive power is impaired. In certain cases, it seems as if the sympathetic system was but little affected, and the main stress of disease fell upon the cerebro-spinal. This one may conclude to have been the condition in the instances mentioned by Graves,[1] where he says, "it was very curious to see a patient with a skin of a natural temperature, a perfectly natural pulse, tranquil respiration, clear eyes, no headache, a soft and fallen abdomen, incoherent, or with a low muttering delirium, excessive subsultus, extreme debility." A case of typhoid, under Dr. Sibson's care in St. Mary's, passed through the disease without having a pulse above 90, or a temperature above 98°.

Certain well-marked morbid conditions may be referred to as very confirmative of the views above expressed. In tetanus, though not a febrile disease, the temperature sometimes, Dr. Radcliffe says especially in the fits of spasm, is much elevated. Wunderlich has recorded a case in which the patient, shortly before death, had a temperature of 110·7°, and pulse of 180. At the moment of death the temperature was 112·5°, and an hour later it was 113·8°.

A patient of my own, a few hours after receiving a severe stroke of influenza, had a temperature of 106·5°, and a very weak pulse of 135, with very great headache and prostration. There were no other symptoms during his illness except giddiness, and brain-debility, besides the fever. With quinine and stimulants he recovered well, but slowly.

Trousseau mentions ('Clinique Méd.,' vol. iii, p. 64) the case of a female, æt. 22, recently confined, and exhausted by suckling. She was anæmic, and her face appeared "absolument celle d'un cadavre." Although her child was taken from her breast, she made no improvement during fourteen days; she had continual fever; pulse 120 to 130; dry hot skin, utter anorexia, and continually increasing weakness. So great was her debility that she fainted if she sat up in bed. With difficulty it was made out that the thoracic organs were healthy. With oxygen inhalation she regained appetite, the fever ceased, and she recovered.

All these cases, different as they are in many respects, concur in this—that prostration and fever are the capital phenomena; and we can hardly err in regarding them as causatively connected, since in the two latter the fever subsided under the use of strengthening measures. There can be no question that the nervous system in all must have been gravely affected, and there is not the least reason to suppose that the vagi and vaso-motor nerves were exempt from the general prostration.

---

[1] 'Clin. Med.,' p. 157.

The following is a good example of the scientific application of such views, and I may add of kindheartedness. It occurred to one of St. Mary's old students. When he arrived in India he was taken with severe fever, for which he was treated by Dr. Waller, who took him to his own house, gave him two twenty-grain doses of quinine, and a glass of port wine pretty often. He recovered rapidly. Does not this seem rational treatment—to counteract the febrile effects of prostrating influences, heat and malaria, by tonico-stimulant remedies? The reason that we cannot deal in the same way with our common fever, typhoid, probably is that the poison is of a more material and fixed kind. Still, all our therapy is in the same direction. Nitric acid freely, and brandy and milk, constitute my chief resources.

Let us now turn to the opposite type of fever, the sthenic, marked by strong, frequent, full or hard pulse, dry hot skin, intense headache, active delirium, laboured respiration, diminished or suppressed secretions, in which bloodletting is not only tolerated, but may be essential to the preservation of life. It is evident that in such cases the greater part of the organs must be in a very different vital state to that which exists in low fever, where stimulants are for the most part of prime necessity. Let it be assumed that the poison acts primarily upon the sympathetic system and the associated vagi, limiting its action to them, as woorara does to the motor nerves: increased heat of the body and blood will be developed, the cardiac action increased, and subsequently a tendency to local congestion produced, varying in situation according to the part where the paralysis is greatest. The muscular tissue not being debilitated as in low fever, the heart will act vigorously under the loss of the controlling influence of the vagi, and the arterial tension will be increased. In the first edition of this work I accepted Calliburcès' experiments as proving that increased blood-heat acted as a stimulus to the heart. Subsequent consideration has led me to doubt their applicability to the present case, chiefly because cutting off the arrival of blood from the heated limb did not prevent the increase of cardiac action. I am also led to assign the chief importance to paresis of the vagi in promoting increased action of the heart, from observation of the much more considerable and constant effect of exercise in quickening the pulse than of fever. The chief feature of the latter is unnatural heat, of the former, consumption of nerve force. It is true that the pulse and temperature are generally correlated, so that above 98° an increase of temperature of 1° corresponds with an acceleration of 10 beats of the pulse, but exceptions to this rule are not infrequent. Thus, Mr. Gibson states that in typhoid fever he has known a pulse of 100 to exist with a temperature of 105·6°; in jaundice a pulse of 58 with a temperature of 103°; in rheumatic fever a pulse of 80 with a temperature of 103·5°; in peritonitis a pulse of 80 with a temperature of 102·2°; in tetanus a pulse of 72 with a temperature of 104°. A patient with erysipelas, under my care, had a temperature of 105·8°, and a pulse of 100. Dr. Peacock has seen cases of fever in which the pulse never exceeded 52, and a case of pneumonia in which it ranged between 50 and 60, without there being any cerebral disorder, and in which the pulse rose with the progress towards recovery. ('Med. Times and Gaz.,' Jan., 1864.) The influence of conditions which simply exhaust nerve power on the pulse is more constant, I think, than that of increased blood-heat, which, after all, may accelerate the pulse by itself causing paresis of the vagi. The hardness of the pulse in certain (sthenic) fevers and inflammations, implies a contracted state of the arterial coats. This, if general, is an opposite condition to that which is produced by section of the sympathetic, and, therefore, demands explanation in an hypothesis which is based on a presumed palsy of the system. It is to be remembered that arterial dilatation is by no means inseparably connected with increased blood-heat; that the latter persists when the hyperæmia, which the former occasions, has materially subsided. In sthenic fevers, it may fairly be presumed that the arterial coats, like the heart, retain for a time excitability, and contract, therefore, moderately under the direct stimulus of the rapid blood-current which traverses them. The pulse is, therefore, hard. In low fever, on the contrary, the pulse is soft, because the poison impairs at once the vital power of the arterial coats, as well as that of their vaso-motor nerves.

Pyrexia, or the fever of inflammation, may next be considered. It is, probably, excited by a morbid impression conveyed from the inflamed part to the nerve-centres; in consequence of which, by a reflex inhibitory action, the vagi and vaso-motor nerves generally are enfeebled, and so, as in other cases, fever results, with increased cardiac action. The production of pyrexia is the ordinary case; the exceptional is that already mentioned (*vide* p. 11), where irritation in some organ occasions paralysis of musculo-motor nerves. On the view just proposed, it is intelligible why the administration of tonic and nervine medicines is injurious in the pyrexia of sthenic inflammation, while it is beneficial in that of asthenic. The inflamed tissue being highly sensitive and impressionable, becomes further irritated by the tonic remedy; and so the morbid impression conveyed to the centres, and reflected on the vaso-motor nerves, becomes intensified. By the employment of tissue sedatives, on the other hand, the morbid stimulus is annulled, and the fever movement subsides. The dependence of what is called hectic fever on the existence of a source of irritation, is often very apparent, the fever ceasing immediately on the removal of the diseased part. Here the cause acts on the nervous centres much in the same way as we suppose it to do in ordinary pyrexia, but, owing to the long continuance of wear and tear of the nervous system, the centres become so irritable that the phenomena of simple paresis (fever) alternate more or less with those of spasm (chills). In simple pyrexia and continued fever this excitability is absent. The deep red colour of the urine in hectic fever and pyrexia is often very striking, and affords good evidence of the rapid destruction of blood-globules, as well as of other tissues, which is taking place under the loss of regulating nerve influences.

The cause of the *rigors* of fever is a question of some interest. The phenomenon clearly belongs to the nervous system, and must be regarded as a kind of minor convulsion. It can be produced by various morbid impressions made on sensitive surfaces, as when a catheter is passed along a hyperæsthetic urethra, or, as in the case mentioned by Dr. Watson, where immersion of a recently scalded arm in cold water brought on severe rigors. The forcing of a gall-stone along the narrow duct may have the same effect, and so may a descending renal calculus. I have found, in my own person, very extensive irritation of the skin from harvest bugs produce, even during very warm weather, distinct, though slight, shivering. Similar shivering was observed in the early part of catarrhal fever, evidently connected with cutaneous hyperæsthesia; the sensation of coolness, which in health would have been very agreeable, being then actually repugnant. In malarious and other fevers, the initial rigor is probably dependent on the action of the poison on the spinal cord, throwing it into a state of undue excitability, so that the nerves issuing from it keep the muscles in a state of clonic contraction, while the vaso-motor nerves maintain the arterial organic muscles in superficial parts in a state of tonic. The same influence thus produces varying effects, according to the structures on which it acts. The rigors of pyæmia and of suppurating foci I should ascribe to the operation of contaminated blood on the nervous centres, and regard them, therefore, as having a similar causation to those of ague. On the other hand, those of hectic fever are most probably essentially dependent on nervous exhaustion, the centres falling into a state analogous to that existing in chorea, but manifesting itself in disordered actions of the vaso-motor more than of the musculo-motor system. Generally, there seem to be three factors concerned, or liable to be concerned, in the phenomenon:—(1) A stimulus, mostly of a morbid kind; (2) an altered hyperæsthetic condition of a sensory surface; (3) a more or less excited or mobile condition of one or more nervous centres. In most cases the coexistence of two of these is necessary. Billroth[1] states, with regard to the rigors attending on fever of surgical affections, that their principal condition is a very rapid increase of temperature; another is a peculiar irritability of the patient (*i. e.* of his nervous centres), which may vary much in different cases, or in the same case at different times. He does not consider the rigors in pyæmia as necessarily dependent on blood-poisoning. V. Barensprung has shown that the heat is already increased before the rigor sets in, but that it increases much more rapidly during than before the rigor ('Year-book,' 1863, p. 35). There is no doubt that increased heat of the blood most frequently coincides with rigors; but inasmuch as they may occur where there is no fever (*vide suprà*), and be wanting when fever exists, it seems to me most probable that the increased temperature is only a co-product of the original cause. The poison, by paralysing the vaso-motor nerves, causes fever, and by acting on the nervous centres, when they are highly excitable, produces rigors. Here we have an example of the generation of spasm and paralysis by the same cause. Another very remarkable instance of this kind was a case of pneumonia, under my care, in which rigors were succeeded after a short time by paralysis of more than twenty-four hours' duration. How much the occurrence of rigors depends on the vital condition of the nervous centres appears from their inconstancy. They are often absent in cases of fever and inflammation where they might most reasonably have been expected to be well marked. On examining my notes of twenty-three cases of pneumonia, I find that in no less than ten no mention is made of the disease having set in with shivering or rigors, but that other symptoms were noted, as giddiness, intense headache, severe prostration, stupor, diarrhœa. A recent writer has advanced the opinion that rigors depend essentially on anæmia of the spinal cord, produced by contraction of the minute arteries. In this view I cannot agree—(1) because I see rigors replaced by symptoms which cannot be considered to depend on anæmia; (2) because the temperature, which is rising rapidly during the whole of the rigor-period, would tend to relax and not to contract arteries; (3) because we know that internal organs in ague become highly congested during the same period; and (4) because during choleraic collapse rigors do not occur, when the blood-supply to the cord must be of the most scanty description, but are severe when after hot saline injection the pulse becomes full.

---

[1] Vid. 'Syd. Soc. Year-book,' 1863, p. 193.

(XI) We may now pass to the consideration of some general points in reference to neuralgia; a condition which in many respects contrasts strongly with fever, and rarely coexists with it. Schramm,[1] however, states that the remittent form of sciatic neuralgia in his experience has been generally attended with fever, and in many cases all the three stages of a paroxysm of fever (malarious) have occurred. The opposition of the two states is well manifested in some cases of malarious fever, where one febrile paroxysm in a series is, as it were, replaced by an attack of neuralgia. This, as well as the common production of some form of neuralgia by malaria, goes far to warrant the view that the morbid phenomena are determined very much by the part on which the poison fixes; pain ensuing if the cerebro-spinal nerves are specially attacked, fever if the vaso-motor, the exciting cause in both being the same. The prevalent opinion respecting the nature of neuralgia seems to be that its existence implies an excited or over-active condition of the sensory nerves. Romberg uses neuralgia and hyperæsthesia as convertible terms, and states—in hyperæsthesia we find that not only the irritation is increased, but that also the irritability of the nerves of sensation generally is exalted both during the paroxysms as well as the intervals. It is very evident that we can have no knowledge from actual observation of the state of the affected nerves and nerve-centres during the attack. We must form our conclusions as best we may from consideration of the attendant circumstances, the "juvantia," and the relation of the disorder to others. For the moment let us put aside all cases of neuralgia which may be regarded as depending on a local irritation of any kind, either direct, as a splinter imbedded in a nervous trunk; or remote, as a worm in the bowels; or, again, on demonstrable poison generated in the system, as in gout, or received into it, as in lead intoxication. There remain, then, all those cases in which the disorder is dependent upon no ascertainable cause, except it be malaria, a draught of cold air, exposure to damp, overwork of mind or body, or some other cause of exhaustion. These form a group which may be distinguished as non-organic or immaterial neuralgia. Now, in these the existing debility and prostration is at least very often almost as marked a symptom as the pain. It is also more abiding and unvarying; and the conviction becomes wrought in the mind of the observer that it is the fundamental state upon which the pain is, as it were, engrafted—the appropriate soil, without which the morbid germ would not grow. It is proved by experience that unless this debility and prostration can be to a great extent removed, and replaced by healthy vigour, no real progress can be made in the cure of neuralgia. The task is like that assigned to Sisyphus: the patient's and the physician's hope is worn out by ever-recurring relapses. The debility seems in a special manner to affect the nervous system. The brain is languid and dull, and inapt for mental labour; sometimes its function actually fails, and delirium occurs. Stimuli are beneficial, often very markedly so, though their effect is temporary. Fresh pure air, good food, sufficient repose, alternating with exhilarating employment, supplemented, if need be, by nerve-tonics, are the real remedies; and just in proportion as they increase the general tone and strength, does the patient attain complete recovery and immunity from relapses. On the other hand, just as surely do all causes of debility confirm, increase, and render inveterate the malady. Now, it may be fairly argued that where the signs of debility, and specially of nerve debility, are so apparent, and have so distinct a relation to the particular symptom, this must be itself of like essential character. It can hardly be that the morbid state of the nerve affected can be greatly different from that which prevails so generally throughout the system, especially when we consider the means which avail for the cure of both. Romberg's metaphorical expression with regard to anæmic hyperæsthesia (neuralgia), that "it seems as if pain were the prayer of the nerve for healthy blood," is in all probability exactly true. The nutrition of the nerve being ill performed, its structure undergoes some molecular alteration which conditionates pain. What is true of neuralgia from this cause, I believe is true of all cases belonging to the immaterial class. Electrical disturbances, damp cold, malaria, seem to me all to act in the like way, as far as we can judge—viz. by deranging the molecular nutritive actions of the nervous structure, and so unfitting it for fulfilling its function. There are several circumstances which seem to me strongly to support this view. One is the very frequent coexistence of numbness along with the pain, especially in highly sensitive parts, as the fingers and hands. One cannot say wherein the condition producing numbness differs from that which gives rise to pain; but it is clear that there is no opposition between them: both are often present together, and the numbness commonly remains as the more permanent condition in the intervals of the paroxysms of pain, and even after they have ceased to occur. Now, numbness is evidently a failure of functional power. Of the same import is the occurrence of various degrees of muscular paralysis, which is often associated with neuralgia, evidently as an analogous affection of the motor nerves. It yields generally to the same treatment. The phenomena of myalgia may also be referred to in illustration of the nature of neuralgia. Here the intimate relation of pain to debility is very marked: the sensory nerves of the muscles suffer because the associated motors are weak; whatever increases the debility increases the pain, and *vice versâ*. In many well-marked neuralgic affections there is evident paralysis of the vaso-motor nerves in the seat of the pain; the vessels are injected, and lachrymation or some similar phenomenon ensues. This makes it probable that the sensory nerves are in a similar state. Lastly, we may allude to the cure of neuralgia by Faradization as an illustration of its nature. The pain of a sensory nerve and the paralysis of a motor may both be removed by the stimulus of the interrupted current. This surely indicates that both states are similar. Even in organic neuralgia it seems to me open to much question whether the affected nerve is in a state of exalted excitability, or simply of deranged and disordered nutrition. In lead-poisoning, the motor-nerves of the muscles are certainly paralysed, the pains are diminished "by pressure and friction" (Romberg), and the whole phenomena are indicative of diminished rather than of increased vital action. In gouty neuralgia, if we take colicky and spasmodic affections for examples, the disorder is much more of an asthenic than of an excitable character. The pain and suffering attending a characteristic outbreak of gout in the foot have much more the features of hyperæsthesia than the colicky disorder. The latter usually requires some stimulant for its relief, and can by no means be dealt with as the articular inflammation. That a nerve which for nutrition receives blood poisoned by uric acid should be disordered in its acting, and thrown into a state conditionating pain, is very intelligible; but it can hardly be regarded as having its functional power exalted.

---

[1] Bayer, 'Arztl. Intell.,' Bl., 34; 1859.

Again, where neuralgia results from the impaction of a spiculum of bone, the development of a tumour or the like, in a nervous trunk, although severe pain may be produced, it does not seem very clear that the nervous irritability is necessarily exalted, *i. e.* that the nerve-filaments, either on the distal or proximal side of the irritant, are more sensitive than they would be naturally. In a case of neuroma of a portion of the auditory nerve recorded by Mr. Toynbee,[1] the only symptom was a diminution of the power of hearing. In a case reported in the 'Dublin Medical Journal,'[2] a female, æt. 27, had a neuromatous tumour, of the size of an almond, developed in the course of the median nerve. If anything, even her dress, touched the tumour, severe pains shot down to the hollow of the palm, and upwards to the shoulder. She complained much of numbness and coldness of all the parts of the hand supplied by the median nerve. The nerve was cut across, and the neuroma removed. Fifteen months after the operation, she was quite free from pain, and observed nothing abnormal except a remarkable coldness of the fingers supplied by the median nerve. It is clear in this case that the neuroma, while it occasioned pain, did not increase the sensory power of the nerve. In some cases, however, it is certain that the peripheral nervous filaments are truly hyperæsthetic, as in the case related by Romberg (vol. i, pp. 37—44). In this, however, the hyperæsthesia may be accounted for by the increased supply of blood sent to that side of the face, the arteries pulsating strongly, and the eye being blood-shot and prominent. The same explanation applies to many other cases where the neuralgia is complicated with hyperæsthesia, but by no means to all.

---

[1] 'Patholog. Soc. Report,' 1851.

[2] 'Dublin Med. Journ.,' May, 1848.

In fact, it is absolutely necessary to recognise Hyperæsthesia as a distinct variety of functional nerve disorder differing from, but closely allied to, neuralgia. It differs from the latter mainly in the intolerance which the suffering parts exhibit for any, even their most natural, stimuli. The eye in this state utterly shuns the light, the ear shrinks from sound, the stomach from food, the cervix uteri from the gentlest pressure. Between hyperæsthesia and a high development of the sensory faculty there exists the widest difference. The practised eye of an Australian native can see a footprint, and infer from it the condition of the animal that left it, where a civilised European can discern nothing. But no one has ever found that a photophobic retina, if it can endure the light at all, possesses any special acuteness of visual faculty. The testers of wine, tea, &c., acquire a power of discrimination, Dr. Carpenter tells us, which is truly wonderful to those who have not exercised themselves in the same manner. But there is no resemblance between this condition and that most distressing disorder, which we shall subsequently notice, lingual hyperæsthesia; nor, again, is there any real affinity between the highly developed faculty of touch which the blind often attain and that condition of the cutaneous sensory nerves which makes the patient flinch from the slightest contact. In short, it is quite clear that increased excitability of sensory or motor nerves is one thing, and augmented functional efficiency another.

The conditions under which (false) hyperæsthesia arises are very similar to those which produce neuralgia, and are altogether such as make it certain that the nerve-power must be enfeebled and deranged. I have found hyperæsthesia of the skin mentioned as a symptom in ramollissement of the brain, in meningitis, in rickets, in the early period of typhus, in influenzal catarrh, in epidemic cerebro-spinal meningitis, in herpes zoster, and as the first effect of the refrigeration of the ulnar nerve (Waller), where it is followed by anæsthesia, of which it may, indeed, be reckoned the first stage. The relation of hyperæsthesia to anæsthesia, and of both to damaged nerve-power, is well illustrated by one of Earle's cases (v. 'Med. Chir. Trans.,' vol. vii, p. 177). A man's arm had been paralysed as to motion and sensation throughout by a fracture of the clavicle. After some time sensation began to return in the integuments about the shoulder and inside of the upper arm, and the muscles of the scapula and the great pectoral began to recover their power. It was curious to observe this gradual return of sensibility; one part of the arm possessing natural feeling, another being morbidly sensible, and immediately beyond being quite insensible to every mechanical or chemical injury.

The above view respecting the nature of neuralgia and hyperæsthesia is strongly supported by the occasional occurrence of acute pain and tenderness in limbs affected with embolism of the main artery. Motor and sensory paralysis are constant, but in some instances there is also pain and hyperæsthesia. A case is recorded in the 'Dublin Quart. Journ. of Med. Science,' May, 1862, of embolism of the right common iliac, femoral, and lower arteries. The symptoms were sudden acute pain in the calf of the leg, which was so tender that the patient shrieked when it was touched, loss of motion in the limb, and loss of sensation from the knee downwards, with remarkable diminution of the temperature. In the case of a female, recorded by Dr. Fuller, who died in thirty-five days with gangrene of both lower limbs, depending apparently on spontaneous coagulation of fibrine in the arteries and veins, which were healthy, the first symptom was acute pain, which set in suddenly without obvious cause. The whole limb, it is said, was so exquisitely tender that the slightest touch caused intolerable pain; it presented, however, no unusual appearance, and no difference could be detected between the two limbs. Mr. Erichsen describes arteritis as attended with excessive sensitiveness of the surface, so that the patient cannot bear the finger to be laid upon it, as well as with deep-seated, burning, and lancinating pain striking through the limb in different directions. The inordinate sensibility continues, he says, after the limb has become cold, livid, and pulseless, but yields to complete anæsthesia as gangrene advances.

The examples now cited afford it seems to me quite sufficient evidence that both neuralgia and hyperæsthesia in their best marked forms occur under conditions of lowered vital and nervous power, and that hyperæsthesia is quite independent of any increase in the blood-supply of the affected part. That a state very similar to hyperæsthesia often occurs also as the result of inflammation is, I think, certain, but it is to be ascribed not to the local afflux of blood but to the lowered vitality of the parts involved in the morbid process, which, as is now well known, always involves a tendency to degeneration and decay.

Besides the morbid alterations of sensibility already noticed, there are various common derangements of this faculty, such as itching, formication, burning, trickling of cold water, and manifold others. There is much tendency to regard these, or some of them, as the result of impressions made on different nerve-fibres, and this view is supported by the fact that consciousness of one or two of these impressions may be lost, while that of the others is retained. The great multiplicity of separate nerve-fibres which would be required on this hypothesis has always seemed to me a weighty objection against it, and I do not see any more difficulty in comprehending that one and the same fibre may be capable of conveying different impressions than there is in the fact that the same wire may convey to the hand vibrations, caloric, and electricity. The phenomena of colour-blindness seem to militate against this theory. Considering the great variety of colours, and the very varying degrees of this defect, it seems impossible to suppose that there can be different fibres in every part of the retina for all the colours and tints which some persons are unable to distinguish, and for which in them, according to the theory, the perceptive media would be wanting or paralysed. The late regretted Dr. Southey Warter informed me that about four years ago he was studying the spots on the sun through a telescope, having previously shaded the eye-piece with a double layer of smoked glass. He was not conscious at the time that the eye had received any damage, but subsequently he has found that there is a considerable difference between the right and left eye in the faculty of appreciating colours, the normal tints as viewed with the left eye being replaced by duller and dirtier shades in the picture conveyed by the right. Strange to say, however, the right eye which gives such false representations of colour is the best for the definition of objects; he can read better with it than with the left. Ophthalmoscopic examination detects nothing abnormal in the eyes. It appears in this case that the retinal fibres have suffered a paresis as respects their power of appreciating colours, while in other respects their functional capacity is unimpaired. It is impossible to believe that there exist different fibres for coloured and for white lights.

Dr. Basham has kindly communicated to me the case of an artist who during convalescence from fever found that all reds appeared to him as greens, the latter not being altered. Under the use of quinine and iron his retinæ regained their normal state. Here there was evidently a paresis of the nerve-fibres as regards a particular kind of impression, but to infer that only certain special fibres throughout the retina were paralysed seems to me unwarranted.

There is no doubt that the sense of taste is ministered to by more than one nerve; the glosso-pharyngeal, the gustatory, and the palatal branches of the fifth, are all capable of conveying impressions of this kind to the sensorium, and all these nerves are also fitted to convey impressions of contact, and the glosso-pharyngeal the peculiar one of nausea besides. Again, the great variety of impressions which the nerves of taste, as well as those of touch, convey has a bearing on this question. One kind of sensation passes into another by slight shades of difference, and it can scarce be thought that the channel of transmission is being continually varied. Pain and pleasure are but modified tactile sensations, yet we know that consciousness of the first may be lost while the faculty of touch remains unimpaired. To my own mind there seems little room for doubt that one and the same nerve-fibre is capable of being thrown by different excitants into different states which affect the sensorium with different impressions. If this be true of the peripheral nerves it probably is true also of the nerve-centres. Of this more hereafter.

The actual seat of neuralgia and hyperæsthesia is in many instances, nay in most, a matter of great uncertainty. We know well that these disorders may depend upon a central lesion, but it is often no easy matter to determine whether such is the case or not. Even where there is no organic alteration, the morbid action may be central, or perhaps both central and peripheral, extending along the nervous cords in their whole length. Such appears to be the case when the pain darts up and down the nerve as it does in some cases of sciatica, or as in other instances where it radiates in a reflex manner from the nerve first affected to several others. Indeed, as we have every reason to believe that the nervous influence is propagated along its paths by molecular change passing instantaneously from particle to particle, it seems that we can hardly speak of nervous disorder as limited to the centre or periphery, though we may sometimes of its originating at either, or at some intermediate spot. If a tumour, a decayed tooth, or the like, vex and irritate a sensory nerve at any point, we may think of the morbid action as starting from that point, but we cannot do so in a case of gouty or malaria-engendered neuralgia, where as nerve and centre are alike exposed to the toxic influence contained in the blood, it is reasonable to conclude that both suffer simultaneously. The centre involved in most instances is the inferior one (belonging to the tertiary group), where the nerve appears to be directly implanted, but it is interesting to observe that in cases of great severity other centres become engaged, first those lying adjacent and giving origin to other nerves, and then the more distant and superior, the emotional or intellectual, as evidenced by the occurrence of hysterical disorder or delirium. The widely diffused hyperæsthesia of hydrophobia, affecting the skin, the mucous membrane of the throat, the eye and the ear, is in all probability as much or more central than peripheral.

Another point for consideration is whether sensations can be referred to any other than the terminal points of nerve-fibres. The law of eccentric phenomena, already alluded to, denies the possibility.

According to this view, all appreciation of sensations as referred to any point in the course of the nerve is out of question. An irritation, wherever set up, must be felt at the peripheral extremity of the fibres implicated, and never in any part of their intermediate course. But there are facts which seem strongly opposed to this exclusive dogma, and which go to prove that a sensation may be referred to various points in the course of the nerve-fibres. If we hit our funny-bone, although, no doubt, pain and tingling are felt at the peripheral distribution in the fingers, yet the chief agony is in the trunk of the ulnar nerve at the part struck, and certainly not merely in the skin covering it. The circumstance dwelt on by Valleix, that the specially painful points in nerves affected with neuralgia are always those where the nerve becomes superficial, is also a proof of sensation being referred to other points beside the terminal. The same may be said of the pains which patients describe as shooting down along the track of a nerve, as often exemplified in sciatica. These certainly are not located merely in the skin which covers in the nervous trunk. From these considerations I am led to admit the possibility of very numerous exceptions to the law of eccentric phenomena, and to believe that pain in a nerve may really indicate by its situation the seat of the irritation, or rather morbid action. This is a conclusion of some importance to the local treatment of neuralgia. It justifies our empirical habit of applying sedative remedies as near as possible to the seat (apparent) of pain. But, of course, we cannot affirm in any case of pain involving the trunk of a nerve that the morbid action *may* not be central: the law of eccentric phenomena holds true so far as that central disorder may certainly give rise to peripheral sensation. The only certain means of distinguishing the site of the pain causing action is division of the affected nerve. If this arrests the neuralgia, we know the disorder is seated peripherally: if it fail to do so, we know that we have to seek more centrally. In a very large number of cases, I fear, it must remain problematical where the real seat of the disorder is. If —the pain being specially referred to some intermediate spot— injection of opium subcutaneously at that part should give decidedly more relief than the same dose at a distance, it would afford ground for believing that the cause of the neuralgia was localized in that spot. In the ordinary way of rubbing sedative liniments on the cutaneous surface covering the seat of pain, we have no means whatever of proving a local action on the suffering nerve, but rather the reverse. For take the case of the sciatic, where pain is acutely felt at the back of the thigh, and notably between the ischiatic tuberosity and the great trochanter: if this be relieved by sedative applications to the covering tegument, we are sure that the chief action of the remedy must be on cutaneous ramifications of the gluteal, lesser sciatic, and branches of the external cutaneous and other nerves on the front of the leg. These will convey impressions to the spinal centre not far from the part where the roots of the sciatic are implanted; so that if the neuralgia were of central origin, it is very conceivable that the morbid action might in this way be beneficially modified. But, considering the depth at which the sciatic nerve lies from the surface, it seems quite impossible that the aconite, chloroform, opium, &c., should penetrate so far through skin, fat and fascia, and even large muscles. This *modus operandi* would be the beneficial homologue of the reflexion of pain. Just as a morbid stimulus, an irritant applied to one part generates pain in a remote by its action being transmitted on to the nerve of the latter, so a beneficial stimulus being propagated in a like way, may cure a remote pain by annulling the morbid condition previously set up in the centre by impressions transmitted to it from a focus of irritation. It is, however, very conceivable that this result is more likely to ensue when the nerves, stimulated with a curative intention, have their central terminations near those of the nerve-fibres, which are in a morbid state. It is remarkable that even neuralgic pain depending on organic lesion may be relieved by remote applications. Mr. Tomes mentions that a sinapism, or ammonia applied behind the ear, will be effective in some few cases of toothache, and may be tried with considerable hope when other remedies have failed. Dr. Weber tells me that he has repeatedly witnessed the good effect of chloroform applied to the ear in stopping a toothache for a time. Mr. Little testifies, from personal experience, to the great efficacy of chloroform applied to the temple in two severe attacks of rheumatic inflammation of the eye, in which the pain came on periodically with extreme severity. The chloroform is applied in a watch-glass so as not to evaporate, and produces a burning sensation locally. He praises its efficacy in a great variety of neuralgias. There can be no question that the remedies act in these instances as local stimulants, modifying the condition of other connected nerves or their centres, through the medium of those on which they directly operate. There exists some evidence to show that any strong impression made on the nervous centres (such as cauterising the ear, galvanising the columna nasi—*v.* Duchenne's[1] work) through incident nerves may put a stop to some neuralgias. This, if confirmed, would very much corroborate the views above expressed.

The pathological relations of neuralgia are, of course, very different according to the cause which gives rise to it. If, however, we take the commonest kind—viz., that which arises from cold, malaria, or debility,—we must allow that it manifests a very close affinity with non-febrile rheumatism. Rheumatic and neuralgic pains are frequently so very similar, that they are only to be distinguished by the action of remedies. Iodide of potassium cures the rheumatic, quinine and iron the neuralgic; while often it occurs that in the same case, after having begun with the former, we have to finish with the latter. The beneficial action of muriate of ammonia in neuralgia noticed by several recent observers can scarcely be dissociated from its remarkable and positive remedial action in muscular rheumatism. The interesting but obscure phenomenon of rheumatic paralysis is closely similar to, if not identical with, the paralysis or paresis of motor nerves, which so often forms a part of neuralgia. Catarrh is allied to neuralgia by the similarity of its causes (the two being often produced by the same epidemic influence), the diffused pain in various parts, the resemblance of its inflammatory actions to those sometimes accompanying and depending on neuralgia, and in a large number of cases by its "juvantia." If exhaustion aggravates a neuralgia, so does it also a catarrhal flux; while rest and toning means have an opposite effect. The affinity between neuralgia and ague in malarious disorder is strikingly apparent: the two disorders so evidently replace one another, that there can be little doubt that the difference is only one of situation; the sensory nerves being chiefly affected in the former, the sympathetic in the latter. The therapeutical effects of arsenic, iron, and quinine in the two disorders also tend not a little to prove their affinity.

---

[1] 'Traité Thérapeut.,' par Trousseau et Pidoux, vol. i, p. 787.

(XII) It seems a well-ascertained fact that the nervous tissue, both in the centres and in the peripheral extensions, becomes more excitable and mobile in proportion as its power becomes weaker. The motor nerve is more readily thrown into action, though the impulse it communicates is weak and cannot be long sustained. The sensory nerve is alive to the least impression, and becomes in certain cases gifted with almost preternatural acuteness. The brain is highly impressible, but incapable of any continuous effort; and headache is easily induced. Stimulants or tonics, which seem and are highly necessary, are tolerated with difficulty. The vaso-motor nerves rapidly alternate between a state of excitement, producing chills, and one of depression, giving rise to heat-flushes and perspirations. It is very probable that this difference in the vital state of the nerves depends on some molecular change in their composition, in consequence of defective nutrition; but no chemical research, that I am aware of, has yet proved such to be the case. Buhl's examinations go to show that a state of unconsciousness coincides with a watery condition of brain, such as is apt to exist in anæmia. The recognition of the above fact, or law as it may be termed, is of prime consequence to a due apprehension of neural pathology. It should never be absent from the mind of the practitioner.

(XIII) The tendency of nerve disorder to aggravation, or to make its first onset at night, is a very noteworthy point. Attacks of epilepsy, asthma, delirium and pertussis, are very prone to ensue at night; while neuralgic, rheumatic, and other kindred disorders, are almost universally aggravated at that time. A talented, but woefully hyperæsthetic female with whom I am acquainted, whose nervous disorder verges towards insanity, has for some time been always much worse towards the close of each day. In the malarioid remittent of children, the paroxysm is invariably nocturnal. The copious nocturnal sweats of phthisis and of obscure aguish disorder seem to be referable to lowering of the power of the vaso-motor and other nerves during this period; since we find tonic, astringent, and strengthening means to have a preventive effect. It is certain that malaria is most potent at night; and this is probably owing to the circumstance that the system is then less capable of resisting it. I believe a similar explanation applies to all the above cases. The morbid causes remain the same, but the nerve-power is feebler and less capable of withstanding them. It is not always easy to say how much of the increased morbid action may be owing to the state of sleep, or to the particular diurnal period. I believe that sleep does increase the liability to some affections, especially to sweating; but in most it is evident that this is not the principal cause, as sleep is entirely banished by the disorder.

Another period at which nerve disorders of all kinds are very apt to be aggravated is the catamenial. This is well called the monthly sickness, for it is certainly a season of lowered general and nervous power; and it has repeatedly occurred to me to find improvement which was previously going on smoothly interrupted by this somewhat troublesome interlude.

(XIV) Another point which deserves to be particularly noticed, is the analogy and connection subsisting between so-called peripheral and central nervous disorders. Perhaps it would be most correct to speak of the former as having its location in nerves, and the centres (the tertiary) wherein they are directly implanted. The morbid action would then be viewed as shifting or extending from centre to centre, not changing its character or quality, but only its site. This conception seems to me to tend considerably to simplify our ideas of disease; it has been suggested by observation of facts actually taking place, and will be admitted, I believe, by experienced workers. Griesinger has published some observations strongly confirmatory of this view. ('Arch. d. Heilk,' 1866, p. 345.) The state of hyperæsthesia in a sensory nerve has its cerebral analogue in many cases of acute delirium and mania; while that of anæsthesia and numbness in the periphery is represented in the hemispheres by stupor and wandering. The same nerve debility, which conditionates sensory disorder in one or other of its forms, gives rise in the motor centres to irregular muscular movements or paralysis, as we frequently see in chorea. The morbid irritability of the hemispheres, which is the proximate cause of delirium, not unfrequently extends to the excitable districts, and then epileptic attacks ensue, or *vice versa ;* "the exalted sensibility of the medulla oblongata" (V. d. Kolk,) which he regards as the starting point or source of spasm in epilepsy, diffuses itself to the hemispheres, and then the epilepsy is complicated with, or replaced by, delirium. In the same way, hysterical hyperæsthesia or anæsthesia is apt to pass into, or be complicated with, disorder of the emotional or intellectual centres.

Two illustrative instances of the preceding views may be cited at present, others will be given hereafter. Sir B. Brodie records the case of a lady who was affected with a spasmodic contraction of the sterno-cleido mastoid, producing what is commonly called wry-neck. After continuing a year the muscular spasm suddenly ceased, and she fell into a state of depression amounting to insanity. This lasted a year also, and then the mind recovered and the spasm returned. Here the morbid action shifted to and fro between the centre of one spinal accessory nerve, and the hemispheres. Dr. H. Greenhow related to me the case of a young man convalescent from typhoid fever, whose legs became extremely hyperæsthetic. Subsequently maniacal delirium supervened, during which the hyperæsthesia disappeared, but returned again as the delirium ceased under the use of morphia. In this instance the hemispheres and certain lower parts of the spinal grey matter, with the implanted nerves, were alternately the seats of an identical morbid process.

(XV) The quality of nerve disorder varies, I believe, greatly; and that not only in different centres, but in the same. In the motor centres we have paralysis more or less complete, tremor, clonic spasm of various grades, and tonic. In the sensory we meet with hyperæsthesia and anæsthesia, together with a vast variety of morbid sensations, which sufferers are wont to describe with great luxury of expression, but which the practical physician is fain to comprehend under the convenient head of dysæsthesiæ. In the intellectual centres delirium of more or less acuteness, illusions, giddiness, stupor, wakefulness, and aberrations from healthy brain action, whose name is legion, meet us continually. All this is perhaps trite enough, yet it does not seem to me useless to state it as my creed that all such varieties of morbid action are for the most part dependent on modifications of the state of the nerve-tissue itself, since, if I mistake not, many are disposed at the present day to refer these disorders to obstructions in the circulation caused by arterial spasm, or by embolism. As we shall presently see, I do not doubt the influence exerted by variations of blood-supply to the nervous centres, but neither can I overlook such facts as the following. Romberg states (vol. i, p. 276, Syd. Soc. edit.) that cholera patients have been seen to come to his hospital on foot, to stand, walk about, rise up in bed, and move their arms, when the pulse had entirely ceased, so that when an artery of a limb was opened during life, instead of a wave of blood issuing, a mere thin fibrinous concretion appeared. In such patients it is evident that the nerve force in the brain must have been greatly more excited and active than is the case in ordinary health, otherwise the functions of the hemispheres and motor ganglia could not have been performed when the circulation had all but ceased. On the other hand, we may take the case of a man who has just passed through an epileptic paroxysm, and is lying quite comatose, but with active hyperæmia evident on the outside of his head, and no doubt existing inside also. Here is the converse case, the brain has received a shock which has stunned it (so to speak), and the free, even excessive, blood-flow is unavailing to rouse it to resume its functional activity. Surely these instances afford sufficient proof that the activity and excitability of the brain-tissue may vary very greatly apart from changes in the circulation.

Whether there exist different fibres in the skin to propagate different impressions to the sensorium, may be disputed, but, at any rate, it is unquestionable that a vast variety of more or less peculiar sensations are produced independent of any change in the blood-flow. What is true of the sensory nerves and tertiary centres is probably true of the higher. The following history has a bearing on this subject:

Case i.—M. A. P—, æt. 27, female, admitted January 25th, 1867. Ill a week. When first attacked she had general rigors, both arms shook and quivered for twenty minutes; after this she found herself paralysed on the left side. Her mother states that when she saw her on January 17th she had cold shivers badly, and was paralysed on the left side, having very little use of the arm or leg, while her speech was so impaired that not a word could be understood, and there was squinting. This condition lasted for nearly two days and then disappeared. At first she was in a cold perspiration, but with remedies she got warm, and became very feverish and thirsty, and quite delirious on the night of the day she was taken ill, and also on the day following. She had been suckling eight months; had no milk at last. On admission her pulse was 112, very weak. Temperature, 104°.3. There was extensive consolidation of the left lung, which did not begin to resolve till about the twenty-eighth day, and reabsorption was not complete till the forty-second. She was thin and weakly.

In this interesting case the nerve disorder which so commonly attends on the commencement of pneumonia, assumed unusually large proportions, no doubt in consequence of the enfeebled resisting power of the system. There were clonic convulsions (rigors), paralysis, as marked by the hemiplegia, aphonia, and squinting, and delirium. However it may have been with the rigors, there can be no doubt that the paralysis and delirium existed after fever, and consequently free circulation had set in, so that we cannot attribute these phenomena to anæmiating vascular spasm. In other instances, moreover, the onset of pneumonia has been attended with very great prostration of nervous power, or with severe giddiness, which can hardly be referred to anything else than direct disorder of the nerve-tissue itself. Such, I believe, was the case here, and the case seems to me of special interest, as illustrating the concurrence of different modes of morbid action in the same system. No doubt the locality affected had much to do with the diversity of the phenomena, the rigors we may attribute to disorder of the cord, the squinting and aphonia to paralysis of the nuclei of the hypoglossal and sixth nerves, the hemiplegia to a like state of the corpus striatum, while the delirium, of course, must have had its seat in deranged action of the hemispheres. Nevertheless, as all these disorders occurred under the same circumstances it seems tolerably clear that there is an affinity and likeness between them, which is quite confirmed by prior experience.

(XVI) In a previous section we have seen how paralysis of vasomotor nerves gives rise to dilatation of arteries, to augmented heat of blood, and to increased vital activity of the tissues, the latter, however, sometimes becoming exhausted, and replaced by more or less destructive inflammation. It seems probable enough that the capillaries cannot remain unaffected by all this change which is going on within and around them. That their structureless wall is not a mere inert membrane, devoid of any peculiar vital power, seems to me sufficiently clear from the following facts. The capillaries of the testes, kidneys, stomach tubes, and salivary glands, must allow a certain amount of albuminous matter to pass through their texture to supply the materials for the formation of the epithelium, or of the secretion. The muscular fibres, the parenchymal liver-cells, and the cells and fibres of the brain, are dependent in the same way for their nutrition on albuminoid matter derived from blood in their capillaries. The same channels where they form the pulmonary plexuses allow, under normal circumstances, nothing but gases and watery vapour to permeate them. On the other hand, the renal capillaries, probably those of the Malpighian tufts, allow a large amount of watery fluid to escape. Those of the brain and fat cells must be peculiarly accommodating to oil. We must conclude from these data that the quality of the capillary wall is appropriate to the place it occupies, and that as it is not uniform everywhere, it is the more likely to undergo changes when placed under abnormal circumstances.

There can be no doubt that the normal retentive power of the capillaries by which they prevent the solid corpuscles and the liquor sanguinis from escaping, is very liable to be diminished in many morbid states. All causes of increased intra-vascular pressure, among which arterial dilatation must be reckoned, operate in this way. But this cannot be the only necessary condition, as we find positive evidence of increased permeability of the capillaries where there is no reason to think that the pressure on the walls of the vessels is increased, and conversely we know that great increase of the intra-vascular pressure need not induce any loss of retentive power in the capillaries. An eminent physician told me that after working extremely hard for some time he found his feet one day so œdematous that he tested his urine with no little anxiety, lest the result should prove that his kidneys were diseased. The urine was non-albuminous, and the anasarca disappeared as his general health improved. The very considerable dropsy which occurs in the subjects of malarial cachexy is another instance of the same kind, and so is the lesser disorder which occurs in anæmic females. The cases of so-called chylous urine which are often attended with hæmaturia afford another instance. In all these it cannot be doubted that there is actual impairment of the texture of the capillaries. This, however, is probably not the sole cause of the leakage, as deterioration of the blood is present also. The latter might account for mere escape of fluid, but not for that of corpuscles, which we now know from Cohnheim's observations to make their way in cases of hyperæmia actually through the continuous capillary wall.

It being fully admitted that the condition in question is often, perhaps mostly, of complex origin, we nevertheless not unfrequently meet with cases which put enfeeblement of nerve-power prominently forward as a cause of non-retentiveness of the capillaries. Such are the following:—In the late American war scurvy appeared among some troops who were fairly well supplied with fresh food, but who had no active employment, and became homesick and disgusted with the service. Several died of scurvy; several who were sick began to recover the moment they were told they should have their discharge. ('Amer. Med. Times,' 1861, June 1st.)

I have several times observed a distinct connection between purpura and delirium in rheumatic fever. It does not seem to be the severity of the rheumatism which determines the hæmorrhage, but the occurrence of delirium, or rather the existence of that nerve exhaustion which leads on to it.

Schneider mentions having been once summoned to a healthy man, æt. 50, who had travelled on foot continuously for twelve hours; during the journey he had perspired much in his feet, and on examining them at the end of it they were found covered as high as the ankles with a sanguineous perspiration, which had also soaked into and stained his stockings. In another case, of a healthy young man, Dr. Schneider mentions having noticed that after a violent exercise, the perspiration beneath the arms was of a bright red colour; and he quotes a similar case from Hoffmann. In proof that the perspiration over the whole body may also be of a sanguineous character, he mentions one case in which it had been observed in a delicate man after copulation, and then quotes the following still more remarkable case from Paulini. While surgeon on board a vessel a violent storm arose, and threatened immediate destruction to all. One of the sailors, a healthy Dane, æt. 30, of fair complexion and light hair, was so terrified that he fell speechless on the deck. On going to him Paulini observed large drops of perspiration of a bright red colour on his face. At first he imagined that the blood came from the nose, or that the man had injured himself by falling; but on wiping off the red drops from the face he was astonished to see fresh ones start up in their place. This coloured perspiration oozed out from different parts of the forehead, cheeks, and chin; but it was not confined to these parts, for on opening his dress he found it formed on the neck and chest. On wiping and carefully examining the skin, he distinctly observed the red fluid exuding from the orifices of the sudoriparous ducts. So deeply stained was the fluid that on taking hold of the handkerchief with which it was wiped off the fingers were made quite bloody. As the bloody perspiration ceased the man's speech returned; and when the storm had passed over he recovered, and remained quite well during the rest of the voyage. (Casper's 'Wochenschrift,' 1848.)

In a most interesting paper by Dr. Russell, of Birmingham (*vide* 'Med. Times and Gaz.,' Oct. 29th, 1864), relative to cases of pimphigus in connection with nerve disorder, he notices as leading features, vascular determination followed by effusion of fibrinous fluid, the occurrence of the malady in distinct paroxysms, the sequence observed in the phenomena, marked nervous disturbance in the particular spot about to become the seat of the eruption taking the lead and remaining limited to the spot, also in one case the presence of a cause operating directly on the nervous system through the mind. A gentleman of middle age while suffering from various nerve disorders having the stamp of debility, and probably depending on latent aguish affection, found one day a patch of subconjunctival extravasation in one eye. No inflammation existed, nor was there any evident cause to which it could be referred, except his neurolytic condition. Other instances will be related in the chapter on special neuroses.

In most instances, perhaps, the vaso-motor paralysis affects the arteries at the same time that it does the capillaries. In some, however, probably where the phenomena only occur in areas of very limited extent (as in slight cases of purpura), the capillaries alone may suffer. There can be no doubt that vaso-motor paralysis may affect the blood-vessels in very different parts of their course. Thus we may have large arteries, as the aorta and carotids, throbbing strongly in states of nerve-debility, without any apparent want of tonicity of the smaller; or we may have the smaller paralysed, as in ordinary active hyperæmia; or lastly, we may have the capillaries paralysed, as in purpura. Very commonly the two latter pareses concur, as in the so-called hæmorrhagic inflammations, of which pneumonia with its rusty or bloody sputa affords a good example.

There is an important passage in Virchow's 'Handbuch der Pathologie,' vol. i, p. 231, in which he states, that on microscopic examination small solutions of continuity are actually seen to occur in the capillaries and small arteries and veins, through which single blood-globules escape one after another, while the current goes on uninterrupted within the vessel. If the gap in the wall is larger the circulation may be stopped in the vessels, and the current may set from all sides towards the orifice. He states further, that after the escape of a certain amount of blood the wall of the vessel may be repaired, and the leak disappear. He does not state in what tissue he has observed these phenomena. I have never witnessed anything of the kind in the frog's web, but I think, nevertheless, that it is extremely probable that the wall of the smaller vessels does undergo modifications which make it permeable by solid corpuscles, without its losing its consistence entirely, the morbid change reducing it in fact to something like a film of gelatine. Such alterations take place under various conditions in which the vital power of the tissues is impaired, and among them I think prostration of nervous power must be noted as one of the principal. The same influences which cause arterial relaxation, will often cause also leakage of the capillaries, and the same means which prove remedial in the one condition avail also in the other. I believe that some change of this kind in the smaller vessels occurs in normal menstruation, and the relation of this process to lowering of nervous power seems to me unmistakable. These views which were stated in the first edition, p. 454, have been remarkably confirmed by Cohnheim's observations.

(XVII) It seems to me not to admit of doubt that *periodicity* of disorder is dependent on affection of the nervous system, and is a sign of it; and that it has no relation to the cause of the disorder. Malarious diseases are very commonly periodic, but are also very often not; and other painful maladies which have nothing to do with malaria, but depend on organic lesion, are sometimes typically periodic. At p. 440, vol. ii, 'Clinique Med.,' Trousseau alludes to the cases of three ladies, in whom most severe neuralgic pains reappeared every day at the same hour with the regularity of the most legitimate intermittent fever. Two of these suffered from cancer uteri, the third from polypus uteri. A fourth case was that of a man who had violent pains returning every day at the same hour, sometimes attended with attacks of unilateral eclampsia, followed by some degree of hemiplegia. At the autopsy a cancerous tumour was found in his brain. Inflammation of the dura mater is sometimes attended with symptoms so like those of ague, and so periodic that a mistake has been made in diagnosis. Graves relates a case of well-marked tertian fever, occurring regularly, but with imperfect intermissions, which resisted quinine, but got well with musk, camphor, and valerian. It occurred in a female shortly after her accouchement.

LEEDS SCHOOL OF MEDICINE

CHAPTER III.

CEREBRAL ANÆMIA.

As one of the simplest morbid states of the brain, we may take anæmia, which properly implies a simple decrease in the amount of arterial blood passing through the organ in a given time. The observations of Kussmaul and Tenner on six male adults, backed by those which they made on rabbits, show very conclusively what are the results of this state when it is speedily induced, when what we may term acute anæmia takes place. When both carotids were compressed in the human subject, the vertebrals of course remaining open, the principal phenomena were, pallor of the face; loss of consciousness; dilatation of the pupils; slow, deep, and as it were sighing respiration; and, in two cases of weak intellect, a choking sensation, followed by vomiting and general convulsions, which disappeared in a few seconds after the compression was removed. Ligature of the common carotids, one or both in succession, may produce no symptoms, or may cause paralysis and convulsions; the convulsions affecting the same, and the paralysis the opposite side. The paralysis may precede, accompany, or follow the convulsions. The eye of the operated side sometimes becomes blind. Other symptoms which have been observed are "dizziness, stupefaction, insensibility, loss of consciousness, of speech, and of free play of the muscles in general; difficulty in swallowing, nausea, vomiting, swooning, and coma." The authors whom we are quoting proceed to state that post-mortem examination traces the cause of the paralysis to anæmia and softening of the corresponding cerebral hemisphere, to a greater or less extent. They are satisfied that, "epileptic convulsions only manifest themselves in man, when, together with the cerebrum, some or all of the parts of the encephalic mass lying behind the thalami optici are suddenly deprived of blood to a sufficient amount, but that sudden falling down, announcing the approach of an apoplectic attack (?), unconsciousness, and insensibility originate in causes proceeding from the brain proper." Kussmaul and Tenner state that convulsions from hæmorrhage do not ensue—(1) when the hæmorrhage is slow; (2) when the animals are very much debilitated; (3) when the nutrition of the spinal cord has suffered; (4) when large pieces of the excitable districts of the brain have been removed; (5) in animals subjected to etherization; (6) doubtless, when the excitable districts of the brain have undergone certain pathological alterations. The first and second clauses afford a reasonable explanation of the non-occurrence of convulsions in many cases of cerebral anæmia. The affection termed by Trousseau, "congestion cérébrale apoplectiforme," in which he believes there is no congestion at all, but that the disorder is rather allied to epilepsy or syncope, seems to be essentially of anæmic character. A man falls down suddenly, as if stricken by apoplexy; is taken up in a state of stupor, and for a quarter of an hour, or even longer, remains more or less in the same condition—his intelligence confused, and his gait uncertain. The following day he is quite well. In slighter cases, the patient is attacked, all at once, with giddiness; loses sight and speech, and staggers, sometimes falling down, but getting up again immediately. In three or four minutes he is quite recovered. In these cases, as in ordinary epilepsy, the face is pale at the commencement of the attack, and only becomes flushed afterwards. It is a curious circumstance, which was observed in the compression of the carotid experiments above quoted, that on the removal of the pressure, the face became suffused. Indeed, Kussmaul and Tenner state, as a general result of their observations, that releasing the ligature from the cervical arteries always produces temporary hyperæmia of the brain. Profuse hæmorrhage after delivery, says Dr. Gooch, will cause the woman to have a distressing headache, with throbbing in the head, noises in the ears, a colourless complexion, and a quick, weak, often thrilling pulse; all which symptoms are greatly increased by any exertion. When embolia of the cerebral arteries occurs, it is found that obstruction of the carotid, or of its branches, occasions sudden giddiness, loss of consciousness, syncope, deprivation of intellectual and motor power, blunting of sensibility, sometimes involuntary stools, and occasionally vomiting. The attack is, if death does not take place, transitory, and leaves behind one-sided palsy of the body, or amaurosis, besides loss of speech, and disorder of the intellect. Recovery may be complete when one carotid trunk is obstructed, but is always imperfect when the obstruction is situated on the further side (from the heart) of the circle of Willis. When the vertebral or basilar arteries are obstructed, loss of consciousness and intellectual disturbance more rarely occur, but giddiness, and vomiting, and sensory disorders are more frequent. The attacks are less sudden, and improvement also is more gradual. Recovery, as far as existing records show, is only possible when the collateral circulation is established before forty-eight hours have elapsed from the date of the obstruction. ('Meissner's Report on Thrombosis and Embolism, Schmidt's J.b.,' vol. 117, p. 209.)

We next proceed to consider the effect of more chronic, and generally induced anæmia. Abercrombie[1] describes how children may lie, for a day or two, in a state of stupor closely resembling coma from organic disease—insensible, with dilated pupils, eyes open and insensible, the face pale and the pulse feeble, and yet recover under the use of wine and nourishment. This state is induced by causes of gradual exhaustion, going on for a considerable time. It may occur in adults, though less frequently than in children. "It differs from mere exhaustion in the complete abolition of sense and motion, while the pulse can be felt distinctly, and is in some cases of tolerable strength." The same author relates the case of a gentleman, æt. 30, who was reduced to a state of extreme weakness and emaciation, by some complaint of the stomach. As the debility advanced he became very deaf; and this symptom varied in the following instructive manner. He was very deaf while sitting erect or standing; but when he lay horizontally, with his head quite low, he could hear very well. If when standing he stooped forwards, so as to produce flushing of the face, his hearing was perfect, and upon raising himself into the erect posture, he continued to hear distinctly as long as the flushing continued; as this went off the deafness returned.

Stokes relates the case of a man, æt. 68, who, on admission, was haggard and emaciated, and seemed the wreck of what was once a fine robust man. He lay generally in a half drowsy state, but when spoken to was perfectly lively and intelligent. He stated that his health had been robust until about three years ago, at which time he was suddenly seized with a fainting fit, in which he would have fallen if he had not been supported. This occurred several times during the day. Since this he has had at least fifty such seizures. They seldom last more than four or five minutes, and sometimes less; but during that time he is perfectly insensible. He never is convulsed or froths at the mouth during the fits, but he has occasionally injured his tongue. His pulse was slow, only 28 or 30. Premonitory sensations were at first referred to the stomach, but some months later, when the attack had diminished very much, to the right shoulder. When occurring in this latter situation, they were often unattended with loss of consciousness. What most concerns our present subject is, that the attacks became greatly less frequent as his health improved, and especially that on two occasions he warded off an impending fit by the following manœuvre —as soon as he perceives the premonitory symptoms, he directly turns on his hands and knees, keeping his head low, and by this means he often averts (he says) what would otherwise end in an attack.

---

[1] 'On the Brain,' p. 309.

Gooch's own personal experience, as he describes it, illustrates well the chief effects of cerebral anæmia in a chronic form. He says, any one who from long defect in the organs of nutrition is reduced so that he has neither flesh on his body nor blood in his veins, well knows what it is to lay down his head and doze away half the day without any congestion or inflammation of the brain. It is clear that in most cases, in all except those where cerebral anæmia is suddenly induced during a state of health, the condition will not be one of pure diminution of blood-supply, but of diminished and altered blood-supply. The system will be not only anæmic, but spanæmic. Further, this state cannot exist for any length of time without modifying injuriously the nutrition of the brain, and rendering it more excitable and weak, according to the general law which we see so constantly exemplified. This altered vital quality of the great nervous centres may exercise a considerable influence on the subsequent phenomena, as has already been shown by the above-quoted statements of Kussmaul and Tenner. It is a most important fact observed by these excellent inquirers, that arrest of the blood-supply to a muscle, and the nervous apparatus with which it is connected, produces at first spasmodic contraction, followed after a time by complete paralysis. This is true in the case of the iris and the sphincter ani, and, no doubt, holds good with regard to the other muscles of the body. "Suddenly withheld nutrition" causes a sudden commotion, and molecular change in the dynamic matter, which acts in the same way as a stimulus on the nerves. The effect of slowly-impaired nutrition, as just observed, is somewhat similar: it renders the nervous apparatus much more mobile than natural. On the other hand, good and full nutrition renders the nervous tissue much more calm and steady in its actings.

Venous hyperæmia is well known to be equivalent in its influence on nutrition to anæmia. It may give rise to convulsion when it is rapidly induced in the brain, or to mere sopor when it occurs gradually. Of the first we have an example in some severe attacks of hooping-cough, and in apnœa. Of the second, the following instance came under my own observation. A male, æt. 60, was under Dr. Sibson's care in St. Mary's, with an aneurism of the aorta, pressing upwards towards the right, and bearing upon the left brachio-cephalic and superior cava veins. His face, as well as the neck and upper part of the chest, was swollen, and of a deep dusky tint from venous congestion. The appearance was very much as if his skin had been darkened by nitrate of silver. The breathing was quiet, 17; pulse 96, open, soft, and equal in both wrists. The cerebral functions were much impaired. The patient remained constantly in a soporous state, very similar to that of the patients described by Abercrombie. There were no convulsions. Dr. Bright says many of the most distressing symptoms of bronchitis—the intense headache, the wandering delirium, and the lethargic coma—are undoubtedly dependent on the state of circulation through the head. He recognises the influence of the impaired quality of the blood, as well as of its disproportionate quantity on the brain. Vol. ii, p. 221.

We may now proceed to gather up into some general conclusions the chief results of the preceding discursive review. (1) It appears that anæmia of the previously healthy brain, when speedily induced, abolishes its functions and those of the chief organs of special sense. (2) When slowly induced, and associated with spanæmia, it produces effects similar in kind, but less in degree, except in some extreme cases. (3) Anæmia of the cerebral hemispheres, even occurring suddenly, may produce unconsciousness, but not convulsions. (4) Convulsions seem to require for their production an at least tolerably active and excitable state of the brain tissue, and a suddenly induced anæmia, involving not only the hemispheres, but the medulla oblongata, or at least the pons Varolii and tubercula quadrigemina. (5) Passive venous congestion may produce the same effects as anæmia. The bearing of these conclusions on the pathology of epilepsy will be subsequently considered.

The following cases, though not simple instances of cerebral anæmia, are, I think, very illustrative of that state, and altogether are of considerable interest:—

Case 1.—H. B—, æt. 31, female, seen in consultation with Dr. Palmer, Jan. 14th.—For about seventeen years has led a very dissolute life, drinking at intervals large quantities of brandy and port wine. After these bouts she would remain sober for a time. Had jaundice and swelled ankles in Scotland two or three years ago. No indications of syphilis. Her general condition five or six weeks before I saw her Dr. Palmer describes as sufficiently startling. There was general œdema from the forehead to the toes, a pasty wax-like complexion, complete anorexia and almost hourly tenesmus, with pain in micturition. The motions consisted almost solely of jelly-like mucus. There was marked tenderness on pressure all over the liver, but nowhere else in the abdomen. Frequent vomiting. Urine cloudy, and usually depositing red or pale lithates; it was examined again and again, but no albumen was detected. Complaints of severe pains across the under parts of the roots of the toes, like those of atonic gout; has pains also in the legs and insteps. Mental faculties blunted and dull. Pulse about 100. Amenorrhœa for three months. Under treatment she improved; the œdema almost disappeared, the skin generally began to look natural, but still she was very weak in mind and body. She could eat a little meat, and slept fairly. After having gone out and taken supper one evening, the symptoms recurred, attended with smart bronchitis of right lung. This subsided under treatment; but she remained in a feeble, semi-somnolent state, with frequent sickness and anorexia. Feb. 5th.—Some appearance of peritonitis, no somnolence, purged freely. 9th.—Several epileptic fits occurred yesterday and to-day; is incoherent, scarcely knowing her mother, and using bad language. 14th.—Up to this date, incoherent, somnolent, talking or screaming, with occasional periods of partial consciousness; sometimes clutches eagerly at food, and eats a little ravenously. Sphincters do not act. Died same evening. My impression, when I first saw this case, was very decided that it was one of renal degeneration, with uræmic poisoning. The urine, however, was unlike any that is usually passed in such states. I examined it carefully on Jan. 14th and Feb. 5th; on neither occasion could I discover in it anything manifestly morbid, except that the last specimen deposited numerous nuclear corpuscles, which appeared to be those of renal epithelium. It was full-coloured, sp. gr. 1017 to 1012, thick, with amorphous lithates, and contained no casts or albumen. As to the amount passed, I think it was rather but not much below the normal; certainly it was not very scanty. At the post-mortem, we found evidences of slight recent peritonitis. The spleen was large, very dark, and contained several small fibrinous masses. The liver was enlarged, and in an extreme state of fatty degeneration, but free from cirrhosis. The kidneys were very flabby and lax, but not apparently wasted; their surface was quite smooth. The matrix appeared thickened, the Malpighian tufts normal; the epithelium seemed to have accumulated in the tubes in excessive quantity, but its particles were stunted and ill-formed. On the whole, it could not be said that the kidneys were at all incapable of functioning. The supra-renal capsules were carefully searched for, on both sides, but no trace of them could be found. There was much fat both within and upon the abdomen; no bronzing of the skin; head not examined. This case goes quite to corroborate Traube's view,[1] who ascribes uræmic phenomena to cerebral œdema and anæmia. Although the kidneys and their secretion were by no means perfectly normal, yet they were, I think, sufficiently so to make it pretty certain that the somnolence, delirium, and convulsions were not the result of poisoned blood. The nutrition of the cerebral centres was evidently seriously impaired for some weeks before death. The cause of the anæmia is obscure. I am scarcely inclined to attribute it to atrophy of the supra-renal capsules, since these organs may be removed from animals without any bad effects ensuing. Moreover, simple atrophy might affect the system very differently to the usual atheromatous degeneration. It seems most probable that the anæmia, the supra-renal atrophy, and the degeneration of the liver, were coincident results of some general cause —perhaps of the intemperate habits.

Case 2.—A. B—, æt. 46. March 28th.—A rather strongly-made man, of medium height, not at all anæmic, rather the reverse. Hair grey. Has usually led an active life, much in the open air. Ill for fifteen months, had at first an attack of painful griping diarrhœa, with some rheumatism: this was followed by loss or impairment of speech, so that he could not express what he wanted. In a few hours, with the aid of a glass of gin, he recovered. Subsequently, during the same journey in Australia, he was unable to get off his horse from stiffness and weakness in the left limbs. A week afterwards his mouth was drawn aside a little. Two or three months later, having been quite well in the interval, he had a severe attack; for three weeks he was quite delirious, and was under medical care three months. He lost all his memory; was heavy and dull; but after a seton had been put in his neck, he became quite lively. He wears the seton still. He could not walk from giddiness at one time, nor use his right arm. Now he can walk, and has tolerably good use of the arm. He used also to have pain, and a sense of heaviness in the head, as well as a feeling of pins and needles in the legs; but these symptoms are much diminished. Pupils are now equal and natural. Speech slow, intellect does not seem vigorous, memory in particular is impaired. Right hand is unsteady; he cannot use it to write. No disease of the thoracic or abdominal viscera. Urine highly acid; deposits lithates. April 10th.—Seton removed; skin cool, head fairly cool, pulse weak and quick. 16th.—Head seems too warm; its circulation tends to be over-active. He says, however, that he has less pain in the head than he had a week ago, and that he can now stoop and move his head better without feeling giddy. 21st.—Can write since his fore-arm has been faradized; not, however, as freely as he used; but this seems to be from a defect in his mental actions, rather than from any want of manipulative power. He finds he misspells words, and uses wrong ones, or cannot recollect the right. In speech he seems to have the same defect; is slow in expressing himself, and does not recollect or comprehend as readily or quickly as he might. But he walks about well, goes long distances, and manages all his matters. Is remarkably active in mornings. 30th.—Was at the Crystal Palace the day before yesterday; was fairly well last night, but had pain in head all night; and this morning, when he got up, he felt ill and weak. His mental power was much impaired; he could not find his way; dropped his gloves and handkerchief; lighted a paint-brush instead of a match, &c. I found him with cold skin and feet, head cool, lips pale, bowels open, no appetite, pain still in head, but no tenderness; pupils natural. A dose of Ammonia + Spt. Æth. S. Co. did not rally him. He had a hot mustard-bath to feet and hands, was put to bed, and took hot brandy and water; after which he was better. He slept all the day, ate a tolerable dinner, and by the evening was free from pain in the head, and had regained his consciousness. May 3rd.—Last night, as he was going to bed, he suddenly became unable to see to read, and felt giddy. This passed off by the next day. His right hand has got more steady since the faradization, he can shave himself. June 10th.—He has had two or three small attacks since last report, always directly traceable to over-exertion, and subsiding with rest and a little stimulus. In these his hands are cold, his pulse weak, he staggers, and his brain evidently fails to function properly. 9th.—Yesterday he went to the Zoological Gardens, having been to the Crystal Palace the day before; he remained well until dinner-time, when he seemed stupefied, and was unable to feed himself properly. When brought home, he was cold, with a feeble pulse, and could only mutter inarticulately. In the morning he was much the same, quite speechless. After hot coffee and brandy-and-water, his pulse rallied, and became full but soft, and his head hotter than before. About two hours after, finding him still unable to speak, and with an active circulation, I bled him to 14 ounces; he bore it very well, but did not improve materially. He got out of bed himself some hours later and walked down two flights of stairs. 13th.—Yesterday he continued in nearly the same state; but to-day, at 11 a.m., he had a severe epileptic paroxysm, and another at 4 p.m. After the first, he had liq. Opii sed. ♏xv, but did not sleep. The convulsions affected both sides, the right especially; they lasted fifteen to twenty minutes. During their continuance, the face and neck were congested and covered with sweat; the eyelids were constantly opened and shut; the respiration at one time was embarrassed. The second paroxysm ceased when I raised his head to put a seton in the neck. 16th.—Since the last report, he has had very numerous epileptic paroxysms, many of them very severe, and the intervals sometimes shorter than the attacks. He is quite unconscious: urine is passed in bed: body bathed in sweat. In evening of 14th he began to take morphia by Dr. Sieveking's advice, who saw him with me, and I administered chloroform by inhalation. By noon of 16th, he had taken about six grains; the pupils were contracted, the pulse good, 96, and the epileptic attacks had ceased for twelve hours. 18th.—Remains still unconscious; no convulsions; he continued to sink all day, and died at 6 a.m. of 19th. During the last twenty-four hours the right arm was evidently paralysed. P.M. twenty-eight hours after death.—Scalp pale; cerebrum very pale. Arachnoid of surface white-spotted, lifted up by clear fluid which was abundant everywhere. The grey matter was everywhere very pale. The vessels appeared fairly healthy: there was no trace of emboli. All the parts, cerebellum, mesocephale, medulla oblongata, and cerebrum, were carefully examined; but to the naked eye there was no evidence of morbid change in any of them; only the roof of the ventricles was, perhaps, abnormally firm. Careful microscopic examination was made of the thalami optici, and corpora striata, as well as of the cerebrum, cerebellum, and medulla oblongata; but the only change that was detected was the deposition of orange-coloured pigment masses, along the vessels of the two cerebral ganglia; there was nothing else that could be pronounced certainly abnormal. In the fornix, however, the fibres seemed to be in great measure disintegrated. No exudation corpuscles were found anywhere. The heart was very flabby indeed, but the muscular tissue of the left ventricle was fairly healthy. Kidneys very flabby, but not diseased. *Remarks.*—The primary disorder in this instance is, unfortunately, obscure. All that can be affirmed is that it left no unequivocal traces of organic change, and yet it impaired and weakened the functional power of the brain. It may have been an attack of congestion, or, what I rather incline to, an affection of the nature of sunstroke. There seems no doubt that the seton for some time was highly beneficial, but its removal was not apparently injurious. Some strychnia which was given on two occasions did not seem to have much effect, although it caused once spasmodic twitchings. The patient was of a very active disposition, and greatly disregarded my repeated admonitions to keep himself more quiet. The enfeebled state of his nervous power was clearly shown by the frequent recurrence of failure of cerebral function, generally in connection with over-exertion. The circulation was always depressed at these times: but this seemed to be secondary, and there was no indication of ordinary syncope. It appeared as if muscular exertion consumed the nervous force, and left the cerebral centres enfeebled. The last attack clearly was produced in this way. In this it was evident that it was not only depression of the circulation which caused the failure of cerebral power, but that the paresis of the latter, to some extent at least, was primary. This may be fairly inferred from the circulation having become vigorous without the restoration of the cerebral functions. The venesection had no immediate effect, either for good or bad; but there is too much reason for suspecting that it may have been concerned in inducing the convulsions which came on three days later, and caused death by asthenia. The results of the dissection, taken together with the history of the symptoms, incline me much to believe that the impairment of function proceeded rather from dynamic than from an organic defect, and that, under more favorable circumstances, nearly complete recovery might have been attained. Admitting—which is, I think, probable—that some amount of organic lesion had occurred, it seems from the history of the disorder that this was rather general than local, and probably it affected chiefly the grey matter of the convolutions. The anæmic condition of the brain after death certainly corresponds very well with the symptoms which occurred during the last few days of life; and the supposition seems very probable that during the previous less severe attacks the condition of the brain was similar, especially as during these attacks the general circulation was evidently much depressed. How this failure of circulation was brought about is not at first sight clear; most probably it is to be ascribed to the close commissural connection existing between the cardiac centres in the cord and the superior encephalic. We know that a sudden shock to the brain will powerfully depress the heart's action; and we may conceive that the cerebral collapse would have the same effect in this case. On the other hand, the slackening of the circulation would, of course, considerably increase the primary cerebral paresis. The sub-arachnoid effusion was, I believe, the result of the paresis of the brain, whose nutrition was no longer adequately carried on, and so there ensued a kind of passive exudation from the blood-vessels to fill the space of the shrinking organ. The fatal convulsions resulted, no doubt, from the increasing debility, and anæmia of the encephalon having produced, according to the general law, *v.* (XII), p. 54, a state of hyperæsthesia of the excitable districts, the mesocephale, &c., which displayed itself in this manner. They were too prolonged and recurred too frequently to have depended on mere spasm of the carotids and vertebrals, though this may have occurred at intervals and had some share in the phenomena. Kussmaul and Tenner state that the brains of rabbits could not be deprived of blood more than two minutes without death actually ensuing. On the whole, I regard the case as one in which, owing to some unknown influence, such as sunstroke, the functional power of the brain had become much impaired, and was left in a condition liable to be still further depressed by slight causes.

---

[1] Schmidt's 'Jahrb.,' vol. cxiv, p. 308.

The morbid changes induced by cerebral anæmia, in so far as they are demonstrable, are such as might have been anticipated. The insufficiently nourished tissue falls into a state of decay, termed "white softening." This occurs in the human subject in about five days, or rather sooner, according to the reports which are given of the operation of ligaturing the carotid. It is no uncommon thing to find in connection with an anæmic state of the brain after death an excessive amount of interstitial and sub-arachnoid fluid. This is secreted to take the place of the more or less shrunken cerebral mass, and is poured out all the more readily in consequence of the loss of tone in the coats of the vessels. According to Buhl's researches, this condition of a "wet brain" coincides with a tendency to stupor. In cases of softening, affecting part only of one hemisphere, resulting from embolism of an artery, it is affirmed by Panum[1] that the appearance of the softened part depends on the time at which it is examined after the deprivation of blood. Red softening commences in twenty-four or forty-eight hours, and lasts from eight to fourteen days: it is succeeded by yellow softening, and this again, after several months have elapsed, by white. The cerebral tissue in the affected part becomes gradually softened and more disintegrated, and paler in colour as time elapses. In red softening there is always increased tension and injection of the collateral vessels. The colour is produced not only by vascular injection, but by capillary extravasations. Subsequent changes consist in fatty degeneration of the tissues and decolorization of the blood-globules.

The diagnosis of cerebral anæmia is evidently a point of the highest importance, and one which may by no means be always easy. When the face is pale, the scalp cool, the eyes uninjected, the general circulation quiet—when there is no appearance of cerebral excitement, but rather of failing power—when the recumbent position affords relief, and the distressing sensations in the head are described as a weight at the vertex, or a feeling of opening and shutting, and as if the top of the head were being lifted off—the nature of the case is clear. But there may be conditions of the most marked general anæmia or spanæmia, in which, of course, the cerebral circulation participates, and yet in which there may arise temporarily a state of cerebral hyperæmia. By this I mean that though the blood is evidently of very imperfect quality, deficient in solids and in red cells, yet that an excess of this blood is sent to the brain above what it ought under the circumstances to receive. Nothing is more common than to find anæmic patients complaining of headache from the administration of necessary tonics, because their nervous centres have been brought into such a state of hyperæsthesia by the impaired nutrition that they can hardly tolerate anything of a stimulant nature. A little excess, therefore, even of spanæmic blood, may cause distress to a feeble brain, which, after it has regained more healthy tone, will bear and be benefited by a larger amount of much better blood. The case is similar to that of the starved man, whose very preservation depends on his being fed most sparingly for some time. The following case is of interest both as regards diagnosis and treatment:—

---

[1] *Vide* Meissner's 'Report in Schmidt's Jahrb.,' vol. cxvii, p. 209.

CASE 3.—J. W., æt. 31, smith, admitted August 4, 1862.—Is in a state of the most extreme anæmia from rectal hæmorrhage, which commenced nine years ago, and has recurred at intervals ever since. Latterly it has been constant; he bleeds whenever he has a motion, and even sometimes when he urinates. Has lost as much as a pint at once. His head throbs; he has pain at the precordia, palpitation and giddiness in walking. Bowels usually loose. A *bruit de diable* is heard on both sides of the neck, very loud when he turns his head to the opposite side, feebly when he holds it straight. Skin cool; pulse feeble. No piles could be discovered. On examination, the mucous membrane was pale, and rather relaxed. Ordered lead and opium pills *ter die.* with castor oil and sulphur *o. n.* 7th.—No bleeding, or very little, since. Became unconscious to-day about noon, and is now (7 p.m.) quite so; he lies with his head low, thrust down into the pillow, turns away from me, and struggles pretty strongly if I attempt to turn him; perspires a good deal, and is rather hot; pupils dilated, pulse over 100, and rather forcible; some stomach disturbance to-day. His condition was rather one of soporose delirium than of coma. Opium was ordered, ♏xl of Tr. opii *statim*, and ♏xx *o. h.*, until he appeared to sleep; but he would not take it, kept his mouth firmly closed, and at 12 midnight I found him very restless, thrusting his head repeatedly into the pillow, and quite unconscious. Tr. opii ♏xl *2dis horis in enemate.* 8th, 10 a.m. —Is in much the same state; has had two or three enemata; works much with his head against the pillow; has not spoken or given any sign of consciousness. Blister to neck. 6 p.m.—Is now cool. Pulse quieter, smaller, feebler. Has become more conscious, and has spoken, but is still wild and restless, throwing himself about; looks deathly pale. Has taken a good deal of milk and egg with brandy, and small doses of tr. opii, 9th, 10 a.m.—Is still very restless, and perfectly pale, but quite sensible, with a cool skin, and a medium-sized pupil; some little bleeding this morning. 10th.—A large protrusion of inflamed piles, partly mucous, and partly cutaneous, was shown me to-day. The skin was divided, and the mucous portion tied with ligatures in two separate masses. Some blood that flowed I observed coagulated perfectly. Tr. opii ♏xxx were given in brandy-and-water after the operation. He says he did not know me till to-day. 11th.—Going on well; has had several hours' sleep; temp. of axilla 99°, of hand held out of bed 97° Fahr.; is taking tannin and ol. morrh. 15th.—Doing well. P c. oleo. Tr. ferri mur. ♏xij *ter die*. September 1st.—Quite convalescent; is getting stronger every day; feels better than he has done for nine years; has lost the cardiac palpitation and that in the neck. Pulse very much weaker and smaller than it was during his illness. Bowels act well; no bleeding. Feb. 10th, 1863.—Has had no return of the bleeding; says he is a better man than ever he was. *Remarks.*—This man had been long under treatment, which had quite failed, because the source of the hæmorrhage had never declared itself, as it happened to do while he was under my observation. There was not the least trace of piles when I first examined him, and I had no idea that any would be found. The case is instructive in this point of view, as showing how long concealed the cause of such serious hæmorrhage may remain, and how closely it behoves us to search after the "causa mali." But this by the way. The bearing of the case on our present subject is to illustrate how in the extremest anæmia a state of relative hyperæmia may arise, and bring the patient into serious peril. The brain in this man during his acute disorder was evidently seriously implicated, irritated and over-excited. His forcible struggling and resistance showed that it was no state of mere passive stupor from failure of nutrition. The open, forcible pulse, the increased cardiac action, and the dilated pupil, as well as the heat of the surface, were evidence to my mind that the cerebral arteries were dilated, and that the weak and irritable brain was oppressed by an overflow of blood. There was grave reason to fear that ventricular or subarachnoid effusion was imminent, and that as this took place, and the active congestion declined, fatal coma would ensue. Opium was given, with the view of contracting the arteries, and so by lessening the blood-flow, of reducing the cerebral excitement. Though not administered so regularly as I wished, it was yet given in sufficient quantity to produce an effect; and this certainly seems to have been beneficial. The blister may have aided the action of the opium by causing reflex contraction of the intra-cranial arteries. It was very remarkable how, as he became convalescent, the pulse grew small and weak compared with what it had been during the cerebral attack. This indicates the recovery of the sympathetic system from the state of paresis into which it had been plunged.

It is a question of material importance to determine how far the state of the skin of the head and face may be taken as an index to that of the intracranial organs. One would think it *à priori* probable that the external and internal carotid and their branches would be influenced similarly by the nerves which supply their coats, and, therefore, that the state of the circulation would be alike in both sets of vessels. To a great extent I believe this is actually the case, though not invariably. It must be remembered that the brain is very much more vascular than the skin, and also that it is supplied by two other arteries besides the internal carotid, which receive vaso-motor nerves from a different source. It is, therefore, quite conceivable that the brain might be receiving an excessive supply of blood, although the vessels of the external tegument were but moderately filled. Moreover, if there existed any tissue excitement of the brain, this would create an attraction of blood to the internal viscus, which would tend to leave the external tegument in a minus state. However, I can speak from personal experience to the coincidence of a cold state of the skin of the forehead, with overpowering drowsiness, *i. e.*, cerebral anæmia, and to the converse. I have met with patients who looked at first sight most blooming, but who complained that their cheeks were burning and their heads throbbing, and who wished, in fact, to be cured of their extra- and intra-cranial hyperæmia. As a general rule, if the skin of the head is cool and pale, we may conclude that the intra-cranial arteries are admitting but little blood; but the converse, probably, has many exceptions. Andral, however, states ('Clinique Med. Translat.,' p. 62), that the commencement of meningitis is frequently accompanied by great redness of the conjunctiva and face. This state is sometimes succeeded by great paleness, which sometimes exists from the outset of the attack, and continues to the very last moment of life. This pallor is observed not only in cases of serous effusion, but also in those where false membranes and pus are formed. The state of the eye is, perhaps, a more sure guide than that of the skin. A red, injected, eager eye can scarcely imply anything else than an hyperæmic brain; and a pale, dead white languid eye almost certainly indicates the reverse. Graves relates a case of puerperal mania, in which an autopsy showed the brain to be quite healthy, where the cheeks were greatly flushed, while the sclerotic of the eyes was of a pearly whiteness. He negatives the supposition that the flushing of the cheeks indicates congestion of the brain. The state of the urine may give valuable information. Pale, copious, low specific gravity urine will surely coincide with an absence of arterial hyperæmia; while scanty, red, lateritious, dense urine will invest the cerebral symptoms with an opposite meaning. It is scarcely necessary to refer to the pulse, except to that of the carotid. If this is open and bounding, it indicates that the arteries are uncontracted, and admitting a full current of blood. Of course, the reverse would not necessarily imply cerebral anæmia, any more than in peritonitis the small, wiry pulse implies an absence of inflammation. Panting, hurried, or irregular respiration (the lungs being healthy) would point towards anæmia. The state of the pupil is so much controlled by that of the brain, as also indeed by that of the cord,[1] that its indications are not reliably definite. An excited brain or a depressed cord will produce a contracted pupil, or *vice versâ;* though in medium states I think a contracted pupil generally coincides with contracted cerebral vessels, and a dilated with uncontracted.

The treatment of anæmic states of the brain is sufficiently evident if the anæmia be general; the only needful caution being "*festinare lente:*" that is to say, as fast as the weak and hyperæsthetic nervous centre will permit. Good air and good nourishment, and sufficient rest, are, of course, essential; and for medicines, steel wine, citrate of quinine and iron, carbonate of iron, and cod-liver oil, will generally do good service. In cases where the digestive power is feeble, the lactate of iron, or *fer reduit,* will probably be more easily assimilated than the more common preparations. Pepsine may be recommended to promote the digestion of azotized food.

Where the anæmia is partial the object of treatment must be either to stimulate the languid brain moderately, or to prevent and allay arterial spasm. This subject will be considered in subsequent chapters.

For the following case I am indebted to the kindness of Dr. H. C. Stewart, whose correct diagnosis deserves great praise:

CASE 4.—A general officer, æt. 60, who had been with our Peninsular army, and at Waterloo, and subsequently with the army of Don Pedro in Portugal, has had frequent attacks of intermittent fever, and during the last twenty years has suffered from spasmodic asthma. Dr. Stewart was sent for in a great hurry, and found on arrival that his patient had lost all power over the left side, and had very partial sensation. The muscles of the face on the affected side were all relaxed, while those on the opposite side were rigid and drawn. His tongue when protruded was also drawn to the opposite side. He had great difficulty in swallowing his saliva, and his speech was imperfect. His urine was constantly dribbling away from him. Bowels opened three hours before this attack. There was considerable difficulty of breathing. Consciousness was retained, and but for the difficulty of speaking he would have answered questions correctly. Left pupil contracted, right mobile. Pulse 100, weak and small. Skin hot and dry; thirst; tongue coated thickly. On inquiry Stewart found that he had had similar attacks before, for which he had been bled and mercurialised; that he had also had frequent attacks of intermittent fever and spasmodic asthma. This information led him to believe that the prostration of the nervous power might be dependent upon some miasmatic poison, particularly as he had recently been staying near Woolwich. He gave therefore six grains of quinine, and some warm drink. About forty-five minutes after Stewart learned that he had had a very slight rigor, which was followed quickly by heat, and almost instantaneously by profuse perspirations, while as the attack passed off the symptoms of hemiplegia subsided. For a week afterwards the ague recurred every other day, and with it the hemiplegia, but in a slighter degree. The disorder yielded to quinine. Since then he has had one other attack in every respect similar, but less severe. *Remarks.*—The phenomena in this highly interesting case were produced by spasm of the cerebral arteries, which was so complete on one side as to prevent the nervous centres from functioning. Such spasm of the arteries is constantly present in the cold stage of ague to a greater or less extent, and may be, as in a case I shall subsequently relate, sufficient to obliterate the radial pulse. The symptoms produced by one-sided cerebral embolism are very similar, but the record of the case makes it perfectly clear that no morbid cause of this kind was in action. The paralysis of the sphincter vesicæ shows that the cord must have been affected to some extent, probably in the same way as the brain. It is worth remarking that the facial nerve was palsied on the same side as the limbs, according to the usual, but unexplained, event in all hemiplegia.

---

[1] Dr. Fraser's paper "On Physostigma Venenos.," 'Edin. Med. Journ.,' July, 1863.

The following remarkable history is quoted by M. Bailly[1] from 'Wirtenson's Memoirs on Opium:'

CASE 5.—A lady of distinction was attacked at 11 p.m. with fever, attended the next day with continual nausea and vomiting of all food. After a small dose of tartar emetic remedies were resorted to, to relieve the vomiting, and with advantage. But the second night the fever returned at 11 p.m., and scarcely had the patient complained of feeling ill, when she lost the power of speech and consciousness. Hoffmann, of Munster, who happened to be at hand, was summoned. He found her speechless, and in a kind of sopor, her eyes open and fixed, her limbs stiff, as in catalepsy. Her pulse was small, and intermitted frequently, and her breathing was difficult. In short, she had a well-marked soporous intermittent fever. All who were present feared that she would die speedily. In such cases, eminent authorities advise emetics, irritating enemata, or blisters, and stimulants, but Hoffmann, who had no confidence in such measures, whose inutility he had often experienced, followed a very different method. It was not the case to temporise, and in order to save the patient it was urgent to have recourse to effectual means. What remained then to be done? Try the administration of opium. But how could one venture to counteract an unnatural sleep with a remedy which causes sleep? These considerations did not weigh with this physician taught by experience. He poured into the patient's mouth ninety-five drops of liquid laudanum, and he saw that she swallowed it. After the lapse of a few minutes the pulse was developed, and the breathing more free, and in less than half an hour the lethargy was dissipated, and the danger past. The pulse was full, the limbs had regained their suppleness, and the patient regained consciousness, and began to speak. Febrile heat succeeded, and afterwards sweating concluded the paroxysm. The next day bark was ordered to prevent the return of the disorder, but the stomach rejected it in every form. Enemata of bark were ineffectual, for at the same hour the next night the paroxysm returned, and with the same alarming symptoms as before. The laudanum was given again successfully. The next day the stomach was still intolerant of bark, and a third fit was apprehended. On the suggestion, however, of the husband, the laudanum was given one hour before the time of recurrence; it did not prevent the paroxysm, but it deprived it of the sopor and the alarming symptoms. After it was over, the patient was able to take a vinous infusion of bark, and was soon cured. *Remarks.*—The correct reading of this most interesting case is, I think, as follows:—The soporous symptoms came on at the onset of the paroxysm in the cold stage, at the time when arterial spasm is prevalent. They were removed and obviated by a powerful sedative, which we must presume to have acted on the over-excited, vaso-motor nerves, and to have thus quelled the spasm. As the blood-flow returned to the encephalon its functions were restored. Trotter's experience of the good effects of opium given at the commencement of a paroxysm is quite in accordance with the above history. He found the pulse from being weak, quick, and sometimes irregular, become less frequent, full, and equal; an agreeable warmth was diffused over the whole frame, and every unpleasant feeling vanished. This action of opium is analogous to that which it exerts in cases of renal and hepatic calculus, and spasmodic stricture of the urethra, where it seems to relax contracted muscular fibre. I am well aware that it has been thought even more efficacious in the hot stage of ague, and that it has actions apparently of a contrary kind. These points will be hereafter noticed. It need scarcely be stated that the administration of opium would not be suitable to every kind of soporous intermittent. If the coma depended on hyperæmic congestion, it would be, of course, contradicted, at least in a full dose. It may be remarked with regard to the view I maintain as to the action of opium (v. remedies), that there is nothing inconsistent with it in supposing that a stimulant may cause relaxation of existing spasm, as in Dr. Salter's cases of asthmatic paroxysm arrested by alcohol.

---

[1] Bailly, 'Traité de Fièvres Intermittentes,' p. 436.

I have allowed these cases (Nos. 4 and 5) to stand as in the first edition, although I am aware that another view may be taken of their pathology, viz. that the symptoms rather depended on the direct action of malarious miasm on the nerve-centres than on vascular spasm itself induced by the operation of the cause on the vaso-motor nerves. The point is often one of great difficulty to decide. I adhere on the whole to the view first taken, because in the second case the sopor came on at the very commencement of the attack, was attended with a small intermitting pulse, and with tonic spasm of the muscles (the equivalent of rigors), was removed by a sedative remedy, and was immediately succeeded by a full pulse and fever, and afterwards by sweating. In the first case the state of things seems to have been similar, but the evidence is less clear.

CHAPTER IV.

ANÆMIA OF THE SPINAL CORD.

We are chiefly indebted to Kussmaul and Tenner for any accurate knowledge on this head. They tied both subclavian arteries close to their origins in several rabbits, so that the blood was conveyed to their brains solely through the carotids. They then compressed the arch of the aorta so that all afflux of arterial blood to the trunk of the body was cut off. The results are described as follows. Respiration becomes at once slower, and gradually in the direction from back to front weaker and weaker. The hinder part of the body soon becomes completely paralysed, while the forelegs are only partially so. In most of the animals paralysis of the hinder part of the body came on without any convulsions. In three of them a short slight trembling preceded; whilst these trembling movements were in one case only somewhat more rapid, resembling those occurring in paralysis tremulans, and lasting for some seconds. Within a few seconds, or at most within from one to one and a half minutes, the paralysis of the hind legs was complete. Peculiar movements similar to those witnessed in chorea are regularly observed in the forelegs some time after tying the arch of the aorta. It is not at first clear whether these movements are voluntary, or are involuntary convulsions; the latter, however, is found to be the case. They are frequently repeated, and are produced by a reflex act when the legs are touched. They gradually cease as life becomes extinct. Respiration ceased in from eight to eighty-one minutes after the last constant compression. The heart stopped beating in from eight to twenty minutes after the last breath. Consciousness appeared but little disturbed up to the last moment. In one experiment the subclavians were tied, and the aorta compressed, which produced almost immediately complete paralysis of the hind and partial of the fore legs. The carotids were now compressed, whereupon a violent epileptic attack ensued within a few seconds, but ceased on removing the compression from the carotids. This experiment put in a clear light the part which anæmia of the encephalon plays in producing general convulsions, and shows that anæmia of the spinal cord is marked more by paralysis than by convulsion.

Such being the results which experiment teaches us we may look for when anæmia of the cord exists, we have now to inquire how far we are likely to meet with this condition as an actual morbid change, and how far we are to recognise anæmia of the cord as a *vera causa* of disease. The mode in which the cord is supplied with arterial blood, viz. by a succession of small arteries entering the vertebral canal through the intervertebral foramina to anastomose with the anterior and posterior spinal derived from the vertebral, makes it less likely that it should be deprived of blood by constriction or obstruction of its vessels than is the case with the encephalon. It is not very likely that a large number of small arteries would become and remain constricted simultaneously, and if only a few remained open they would supply blood to the tracts of capillaries. The cases where it seems to us most probable that a paralysis may be dependent on anæmia from arterial constriction are those where the affection ensues paroxysmally apparently in connection with malarious fever. Romberg relates a case of this kind where motor paraplegia occurred according to a tertian type, disappearing spontaneously. After the due administration of quinine the paralysis ceased to return. M. Bailly describes how during his stay at Rome, when he was evidently under the influence of malarious infection, he experienced every day about three or four p.m. an extraordinary weakness of the legs, so that he could hardly get along, and was obliged to use his arms which were unaffected to pull himself by the banisters up stairs. He was cured of this symptom by quinine. The following case, for which I am indebted to my friend, Mr. Moullin, was probably of the same kind:—

CASE I.—H—, æt. 42, labourer, was seized July 9th, while at work, with violent pain across the loins and with numbness running down the legs. The urine was retained so that he could not pass it, and there was involuntary discharge of fæces. When first seen he was lying on his back at full length, the toes pointing straight out, the skin cold, the legs paralysed and insensible, even when pinched with the nail. He was quite unable to stir. No pain or disorder elsewhere. Quite conscious. Ordered an enema of turpentine with aloes, and calomel gr. v. + pulv. jalap. co. gr. x. After the enema and purge had acted freely the limbs still remained powerless ; the pain continued, but was relieved by a croton-oil liniment. July 11th.—Quin. disulph. gr. x. *ter die.* The next day sensation returned, and the next he could sit up in bed. In a week he walked to the dispensary, and soon after was quite well. The record sufficiently proves that no organic disease existed in this case, the suddenness of supervention and the speedy recovery are quite unlike simple or direct paralysis of the cord, the non-success of the purgatives and the good effect of quinine negative the existence of inhibitory irritation, so that *par voie d'exclusion* we are almost obliged to refer it to anæmia from arterial spasm. I have before recorded a similar case where hemiplegia ensued in a like way, and it does seem to me most probable that such cases depend on arterial constriction, principally because we have pretty certain evidence that at the commencement of an ague paroxysm the involuntary muscles as well as the voluntary are thrown into a state of abnormal contraction.

These instances are, however, very rare, and we think they afford no sufficient warrant for extending the same view of causation to all instances of so-called reflex paralysis. To some it may doubtless apply, especially to those where the morbid symptoms are speedily annulled by removal of the irritation. Dr. Brown-Séquard has cited many such (*v.* 'Lancet,' 1860, April 28th), and I think it is certainly probable that some cases of paraplegia are dependent on spinal anæmia of reflex origin. But, on the other hand, it seems tolerably certain that the function of the spinal cord can be carried on with a very scanty supply of blood. In Gooch's case of fatal flooding there was no paralysis, although the loss of blood was sufficient to produce complete loss of vision. A case will be related in the chapter on Cardiac Neuroses where a girl who was almost pulseless, and whose surface was quite chilled, walked from her chamber to the room below the day before her death. Of course a relative anæmia may be produced without materially impairing the functions of the spinal centres. Just as the skin of the fingers retains much of its sensibility even when the supply of blood is much diminished, so it will be with the cord.

On the whole it appears to me that we have no sufficient grounds for regarding spinal anæmia as a pathological state which we are likely often to meet with. It is probable that in cases of paresis, which we shall presently consider, more or less of anæmia may exist; but this is not the primary condition, and does not rule the treatment.

In the treatment of any case of supposed spinal anæmia from arterial spasm, the moderate inhalation of chloroform, friction with stimulating liniments to the spine, the administration of quinine with diffusive stimulants and sedatives, and a prolonged warm bath would probably be the most efficient remedies.

CHAPTER V.

HYPERÆMIA OF THE BRAIN.

By this term we understand an increased flow of arterial blood to the encephalon. This true hyperæmia should be distinguished from venous congestion which is common enough in the closing periods of various diseases, and at post-mortem examinations, but is rarely the object of treatment, and in its action upon the brain approaches much more to anæmia than to true hyperæmia. The common varicose ulcers of the legs afford proof how unfit stagnating venous blood is to nourish the integument, and it may well be imagined how much more susceptible a tissue of so high an order as the brain will be of the deprivation of its proper nutrient and stimulant. With venous hyperæmia we have here, therefore, nothing to do. Of arterial we have first to remark that it may be either physiological, or pathological. The first, when it is subordinate to the functional power of the nervous tissue, and ministers to its activity :—the second when it surpasses this limit, and becomes excessive. To quote a sentence from the 'Manual of Pathology,' p. 81. "In the one case it supplies a want, in the other it imposes a burden." The very same amount of blood-supply may be either beneficial or injurious according to the vital quality and condition of the cerebral structure. A weak and irritable organ will be oppressed by that which only supplies the necessary pabulum to the more active life of the stronger.

Pure cerebral hyperæmia, considered apart from primary cerebral excitement, is by no means very common, at least in this country. Theoretically it requires for its production increased action of the heart and relaxation of the contractile coats of the cerebral arteries. It is mostly in certain malarious fevers that we find these conditions existing. In a case of double quotidian paroxysm under my own care the patient, a male, aged 46, became quite delirious in the fever, "singing and quite out of his mind." The disease soon yielded to quinine. Copland describes the symptoms of the period of reaction as consisting of flushed face, tumid features, prominent red and watery eyes, and pain of head attended by a feeling of distension and throbbing often passing into delirium. Ranald Martin writes of the remittent fever of Bengal during the stage of reaction:—"the blood-current, previously oppressed, becomes now hard and quick, ranging from 110 to 120 pulsations in the minute, and the force and frequency of the circulation through the brain, superadded to the already disturbed condition of the nervous functions, give rise to confusion of ideas and loss of mental control, amounting occasionally to actual delirium." Such is the hyperæmia that he states his life was only preserved by a profuse hæmorrhage from the nose during the height of the first two paroxysms in a severe attack of jungle fever he underwent. He cites from Dr. Henderson a most proving history to show how powerfully the cerebral congestion occurring during remittent fever tends to issue in apoplectic extravasation. So often did the one terminate in the other that it was "hard to draw the line between them."

It is highly probable that in these fevers the hyperæmia is both greater and more injurious because of the impaired state of the nervous force in the brain which is depressed by the primary action of malaria, the original cause of the disease. But even in non-febrile conditions the disturbance may be very great. A writer in the 'Journal of Psycholog. Med.' (Jan. 1863, p. 50) says—even in healthy persons, or persons of plethoric habit, this determination of blood may occasion transient delirium, with various signs of encephalic disturbance, such as extreme sensibility to light and sound, restlessness, pain in the head, and visual hallucinations. A flood of distorted ideas flows through the mind, and overwhelms it; bewilderment and incoherence follow, and for the time being the patient is to all intents and purposes maniacal. Convulsions do not seem to be a usual result of this cerebral congestion, neither of the authors above quoted mention them. Bailly, however, seems to have observed numerous instances at Rome of intermittent fever which he calls "convulsive." In most of these there was great congestion of the cerebral membranes or actual inflammatory exudation, or even extravasation of blood. The following instance affords a good example of severe cerebral hyperæmia passing into actual meningitis.

Case i.—J. C—, æt. 51, admitted July 18th. He was furiously delirious, so that it was necessary to confine him. His pulse was strong and vibrating, but uncountable at first from the continual movements of the arms and body. Two hours later it was 124. The forearms were tensely flexed at an acute angle on the arms, and could not be extended without causing pain to the patient by the attempt. The jaws were firmly closed, the muscles of the lips in continual motion, as were also the lower limbs. Sensibility of surface not impaired. Epigastrium tender. Tongue dry and red. He continued in much the same condition till his death, July 20th, p.m. The arachnoid was thickened, and of brown red colour; the vessels were so injected that their minutest ramifications could be traced. At the posterior part was a false membrane saturated with the red colouring matter of the blood. The arachnoid of the cerebellum was in the same state. The grey substance of the brain was of a remarkable deep red. The vessels of the corpus striatum were injected. Spleen enlarged and much softened. Traces of former inflammation of the stomach, and recent of the intestines.

It is important to observe how much the effect produced by cerebral hyperæmia varies according to the condition of the nervous centre. A tolerably sound organ can bear a moderate hyperæmia without its acting being disordered, but with a weakly excitable one the case is different. In such temperaments the suffering may be very great. Dr. Williams (C. J. B.) narrates the case of a gentleman subject to attacks of determination of blood to the head, which caused him so much suffering and loss of moral control, that he cut his throat to destroy his life. Whilst recovering from the wound attacks came on first with beating of the carotids, then with flushing of the face and head, suffusion of the eyes, and feelings of distraction in the head. Dr. Cox relates the case of a man who was kept under the influence of digitalis, the state of the pulse being always in relation to the degree of morbid excitement in the mind; when the pulse was at 90 he was furious; when at 70, rational; when at 50, melancholic; and when at 40, half-dead. He was perfectly cured (of insanity) by keeping his pulse steadily at 70 (Prichard on Insanity, p. 268). Andral describes no fewer than eight forms of cerebral congestion, but it is plain that most of these were really modes of epileptic manifestations, in which if hyperæmia did occur, it was in no wise of the nature of a cause, but solely an effect. Trousseau has handled this subject very ably in his lecture on "Apoplectiform Cerebral Congestion." It is remarkable even among ourselves how slow many are to perceive any other cause for cerebral symptoms than congestion on effusion. The former is a very real cause of disorders, but I greatly doubt that *per se* it is capable of causing paralysis, nor do I think that such a symptom would ever be the only one. The effects of active hyperæmia, when the cerebral vessels are traversed in a given time by an excessive amount of blood, are more in the direction of excitement than paralysis.

Causes.—Hyperæmia of the encephalon will be induced by all stimulating agents which act directly on its tissue, and excite it to increased functional activity. The chief of these are alcoholic liquors; small doses of opium, camphor, and Indian hemp have a similar effect. The hyperæmia thus produced is secondary. Various conditions causing paresis of the vaso-motor nerves of the cerebral arteries will also give rise to hyperæmia, which in this case is primary and pathological. It is no uncommon thing to meet with persons who flush very much in the face after a meal. A lady under my care suffered so much in this way, her face and neck becoming of a deep red, that she was unable to dine out. She was of a highly sensitive temperament, and had occasionally some choreic symptoms. Mr. Langston Parker, in his excellent work on the stomach in its morbid states, relates (p. 258) the case of a lady who when placed under his care had recently recovered from hemiplegia of the right side, but continued to have pain and throbbing in the head, thirst, flushing of the face, and occasional numbness of the limbs. The head was continually hot, the seat of severe pain at the vertex, with occasional violent and sudden darting pains through it, which made the patient scream out; the carotids and temporal arteries throbbed violently, and the pulsations were seldom less than 100 per minute. The epigastrium was the seat of a violent beating, was full and hot, exceedingly tender on pressure, and the seat of internal pains shooting into the hypochondria, where she had also fixed uneasiness. The stomach and intestines were become so morbidly sensible to impressions, that everything she took produced pain, sickness, and very frequently vomiting; there was constantly an intensely acid taste in the mouth. The patient had previously been recommended rich diet, and stimulants. She was now treated with a few leeches to the epigastrium, and a nightly mercurial aperient; which brought away at first pitchy stools. Her diet consisted of farinaceous food. In a week she was well. Several other interesting cases of a like kind are recorded. Mr. L. Parker seems to consider that the irritation of the stomach was directly conveyed to the brain, and set up there a similar condition. It is very probable that the recent temporary hemiplegia was the result of inhibitory irritation affecting the left motor centre, but the other symptoms seem to me more indicative of arterial dilatation depending on a morbid impression conveyed by the sympathetic nerves of the stomach to their ganglia, and thence to the vaso-motor nerves of the cerebral arteries, which in consequence became relaxed, and thus hyperæmia ensued.[1] The vaso-motor paresis in such cases is of the inhibitory kind explained at p. 11. The extensive diffusive character of the cerebral irritation in these cases, and the non-production of organic disease at least for a long time, indicate pretty clearly that the morbid action is not actually located in the cerebral tissue itself. In not a few cases determination of blood to the head is dependent on a primary state of paresis in the nerves of the cerebral arteries.

It is a very curious and important fact, which is mentioned by Kussmaul and Tenner, and which would not, I think, have been anticipated *à priori*, that releasing the carotid arteries from compression causes intra-cranial hyperæmia. It almost seems as if the nervous tissue by the temporary deprivation of blood was brought into a state of excitability, which induced it subsequently to attract the blood with more force. Or where the arteries have been occluded by a spasm of their own circular fibres it may be presumed that this as it yields is succeeded by a state of paresis and dilatation. The following case exemplifies this :—

Case 2.—A merchant, æt. 65, seen in consultation with Dr. Barrett, Oct. 10th, 1861. He had in July a first epileptoid seizure preceded for some hours by hemiplegia, which passed off with the fit. A second attack occurred on the morning of the 10th, he lay in coma till the morning of the 11th, and was gradually recovering the following evening, but not yet wholly conscious. The circulation after the fit at first was depressed, but by the evening it became very active in the scalp and ears, which were red and hot, and did not give a pale spot on pressure, not even for an instant after the compression ceased. On account of the manifest determination to the head, and the danger of effusion, ℥iv of blood were taken by cupping the night of the 10th; he had also calomel, and enema terebinth. The urine after the attack was free, highly albuminous, not high-coloured, sp. gr. 1022, deposited lithates on standing. 14th.—The stupor has now nearly passed off, though his mental faculties seem rather torpid. Has passed two very dark scybalous motions. Tongue clean. Heart rather enlarged, otherwise apparently normal. Lungs healthy. His legs have been enfeebled for some months past, he walks like a person crippled by rheumatism. Has been generally very healthy. May 9th, 1862.—He has remained pretty well till two or three days ago, when he had an attack of stupor without convulsions. He was relieved immediately by mild purging, and is now tolerably conscious. Pulse of apparently good force, large. Gets weaker in walking. Urine continues constantly albuminous. Some months after he had another attack, and died comatose. *Remarks.*—This case is one of great interest in more respects than one. It illustrates very well the occurrence of coma together with an over-active state of circulation as a sequel of epilepsy, and the danger that this hyperæmia may occasion if excessive. It also indicates the probability that hemiplegia may in some instances depend on a similar pathological condition to that which gives rise to convulsions. It seems for instance very probable in this case that the hemiplegia, which disappeared so speedily, depended like the convulsions on closure of the cerebral arteries; only that during the palsy a different set of vessels was affected, perhaps those of one hemisphere and one corpus striatum only. Subsequently the arterial spasm became more general, and involved the vessels of both sides, and those of the excitable districts, until at last it ended in paralysis. The renal affection, I believe, only so far contributed to the nervous disorder that it rendered the blood less fit for maintaining healthy nutrition, and so induced a state of weakness and excitability of the nervous centres. The loss of an autopsy is much to be regretted, still it seems tolerably certain from the absence of permanent morbid phenomena that there was no material organic change, except perhaps in the lower part of the spinal cord, giving rise to the paresis of the lower limbs.

---

[1] The record shows that the carotid and temporal arteries were paralysed.

Malaria is of course the great cause of cerebral hyperæmia in inter- and remittent fevers. This complication is not so frequent among us as it is in tropical climates; it is nevertheless occasionally met with, and according to my experience most often among children in that form of disorder which I have termed malarioid remittent. Exposure of the head to the rays of a powerful sun seems certainly to cause in some cases cerebral hyperæmia. Dr. Murray, quoted by Sir R. Martin, thinks that this effect is to be distinguished from that of the same temperature in the shade where the action of the heat is more general. In this view I quite concur. The phenomena in the latter condition seem to be essentially those of extreme nervous exhaustion, which we shall subsequently examine. Dr. West mentions an instance in which exposure to the sun's rays clearly induced an inflammatory state of brain. Burns, as in a case I shall presently relate, sometimes have a similar effect. The injury to the skin causes inhibitory paralysis of the cerebral vessels, from which hyperæmia results. The poison of the exanthemata before the eruption appears, *i. e.* before it directs its action to the vaso-motor nerves of the skin, often causes considerable cerebral congestion, apparently from direct irritation of the brain. Dental irritation in children is a frequent cause of cerebral hyperæmia, the head being hot, the anterior fontanelle prominent and pulsating strongly, the brows knit, and the skin febrile. All these symptoms subside on the tooth passing through the gum, or sometimes on effectual lancing. I have seen the flushing of face subside in a few minutes after the gums were lanced in a child who had just had an attack of convulsions succeeded by stupor. In this case it seems to me certain that the convulsions and the cerebral hyperæmia were caused by the uprising tooth (a posterior molar); the question is how. The convulsions probably depended on the increased excitability of certain parts of the brain affected by irritation. The hyperæmia from its involving the extra- as well as the intra-cranial parts, and from its speedy subsidence on removal of the exciting cause must have been owing to inhibitory vaso-motor nerve paresis.

The morbid changes produced by cerebral hyperæmia are well exemplified in the following case:

CASE 3.—J. R—, male, æt. 16, admitted November 11th with a burn of the third degree affecting the lower part of his abdomen, and the upper and inner part of his thigh, as well as the genital organs. The shock was severe. Pulse feeble. Respiration slow. Pain severe at night. On the 13th an erythematous eruption appeared on the chest and abdomen closely resembling that of scarlatina; the tongue also was in a very similar state to that observed in this fever. He passed two very delirious nights; on the 15th the eruption became more dusky, the hands and feet cold, and he sank at 2 p.m., having been perfectly sensible before death. At the autopsy there was found extravasation of blood under the scalp, and effusion of blood between the dura mater and the bone. All the membranes of the brain congested. Effusion of fluid beneath the arachnoid. The white substance displayed numerous puncta vaculosa. The ventricles did not contain an abnormal quantity of fluid. The lungs and all the viscera were congested. Brown-Séquard's experiments have shown that the various remote effects produced by burns are brought about through the intermedium of the spinal cord, which he regards as reflecting the irritation from the burnt part on the secondarily affected organs. In my opinion the remote action of the burn is not on the tissue of the organs themselves, but on the vaso-motor nerves of their blood-vessels, which in consequence of the morbid impression are paralysed. It seems in this case, as not uncommonly happens in such instances, that the textural quality of the minute vessels was impaired so that extravasation of the blood ensued. Paralyses of vessels are I think not unfrequently associated with such loss of retentive power in the capillaries. Common epistaxis with its cure by putting a cold key down the back affords an example where a like state is remedied by the tonic effects of cold acting on vaso-motor through afferent nerves of the cord. The resemblance of the eruption to that of scarlatina in this instance was very close, the chief difference being that the face was but little affected. The mode of causation in both conditions I believe to be similar. It seems distinctive of reflex vaso-motor paralysis that the hyperæmia it produces is diffuse, while that of tissue irritation is more localised and tends more to exudation and suppuration.

The *treatment* of cerebral hyperæmia must depend very much on the view taken of its causation. If it depend on direct irritation as on heat, exanthematous poison, alcohol, &c., it will be desirable if the strength of the patient permit to deplete locally, apply cold, and promote afflux to the feet by hot mustard pediluvia. Internally we may purge or employ Graves' tartar emetic and opium treatment, or repeated doses of colchicum. Dr. Reynolds says, "Many cases of threatening aspect are to be relieved by saline diuretics, and I have known a copious flow of urine to be followed by the removal of symptoms which had existed in spite of free purgation and other treatment." If the hyperæmia depend on paralysis of the vasomotor cerebral nerves from malaria, or other influences, depletory and counter-irritant measures must be adopted to stave off the risk of hæmorrhage or effusion if it appear imminent, and in the remissions nerve tonics, especially quinine, must be administered to remove the primary paralysis. If the vaso-motor paresis depend on a remote morbid impression, this must be mitigated or removed if possible. For this in cases of burns opium is probably the best internal remedy, and a continuous warm bath the best external. Hebra[1] relates that he kept a patient who was severely burnt continuously immersed for twenty-one days with the best effects. Another patient with a frightful and inveterate pemphigus was kept in the bath 100 days with the best results. The soothing influence of moist warmth takes off the depressing inhibitory influence. Mr. Windsor's experience is to the same effect. *Vide* 'Syd. Soc. Year-Book,' 1863, p. 205.

---

[1] 'London Med. Rev.,' Jan. 1860.

The following cases of hyperæmia are of interest:

Andral gives an account of a person, æt. 30, who for five or six weeks had had headache, vertigo, ringing of the ears; at the same time he experienced in the left side of the face, as well as in the left extremities, an almost continual formication; at intervals his intelligence became dull, he stammered and tottered when walking as if intoxicated; at intervals also his mouth became slightly dragged on one side; copious bleeding, various revulsives applied to the skin, as well as to the digestive canal, were resorted to without any benefit. At last an epistaxis came on, during which the patient lost at least 2 lbs. of blood; after this hæmorrhage he no longer felt anything with respect to the head, and every sign of cerebral congestion disappeared.

Lancisi mentions a case similar to the one now cited; it was that of a man, æt. 70, who for a month presented in a very high degree the different symptoms of intense cerebral congestion; at the end of this time he had an epistaxis, in which he lost eleven ounces of blood, and from that time out he was cured.

The above cases afford good evidence of the value of bloodletting, which is expressly affirmed by Andral subsequently. He states that he has very often seen headache, dizziness, tinnitis aurium, numbness of the limbs, &c., disappear all at once after a copious bleeding. But he also adds that he has seen bleeding injurious, and even convert the signs of a cerebral congestion into those of an attack of apoplexy. I have met with a very similar instance myself, and I think there can be little question that the state of the circulation in the head is no sure criterion of the stability of the nerve-force, which may be greatly depressed in one person by an evacuation which another bears exceedingly well, the intra-vascular pressure in each being supposed equal.

Andral adds very positive testimony to the excellent effects of powerful purgation, which sometimes succeeds better than bloodletting. He gives the history of a case in which a man for several years back had been seized from time to time with violent pain of head, great dizziness and palpitations. As these symptoms were not removed by bleeding, two drops of croton oil were administered, which produced very copious dejections. The following day he had neither headache, vertigo, nor palpitations. For several days these symptoms did not appear, then they returned, and were removed by the same treatment. Eight days later they recurred again (minus the palpitations), and were again dissipated in the same way, and this time so effectually that the patient, when the report was written, was leaving the hospital perfectly restored.

Case 4.—E. L—, female, æt. 16, admitted August 20th. Ill three weeks; complains of a burning flushed state of both sides of face, extending to the head, which puts the head into much pain, makes it feel hot. She is obliged by attacks of this kind to go to bed every day. They occur indifferently at all times of the day. She sleeps well at night. Digestion weak. Tongue clean. Bowels open. Pulse soft. She continued under treatment till November 21st, when she was well enough to be discharged. After she had improved I noticed one day that one cheek only was hot, the other being cold. The remedies employed were strychnia and tr. ferri muriatis, and assafœtida. Tannin with gentian and henbane benefited the digestion, but the disorder was certainly not chiefly, if at all, of gastric origin. It was a primary paresis of the nerves of both external and internal carotids, as evidenced by the juvantia and general character of the symptoms. It is very evident how a depleting lowering treatment would aggravate such disorder.

Case 5.—Ch., male, æt. 55, of short, broad make, very short neck. Has been suffering two or three years with an uncomfortable sensation in his head, most felt on the right side, but extending all over it, not worse on lying down, but much increased by a warm close atmosphere, and relieved by the open air, and by cold bracing weather. Seems to be of excitable temperament. If he goes to church can only stay for about an hour, after which he gets so excited and irritable about the head, that he is obliged to come out. His bald scalp flushes with blood while I speak to him. Head apt to be hot, when he is better is cold. Has rushing noises in the head. Feels sometimes weak in his legs, and is relieved by a purge of blue pill + scammony + jalap. Is not subject to rheumatism or gout, nor is the latter in his family. Urine free and natural. Heart's sounds and position normal. No indigestion. Pulse 75, of moderate force. He was ordered nitric and hydrocyanic acids with cascarilla infusion *ter*, and quinine, tannin, and henbane in a pill *bis die*. This treatment proved decidedly beneficial, he found more inclination for mental work, and less tendency to procrastinate.

In the latter case it was remarkable that the patient did not find the uneasiness in the head increased by lying down. The same was observed in another patient, whose symptoms were very similar, the carotids throbbing strongly, but who stated that his head was relieved by the recumbent posture. Even when the cerebral hyperæmia is of traumatic origin the same is sometimes the case.

Case 6.—J. H—, male, æt. 16, admitted September 13th. Ill seven days; was struck by a ball on the head the day before he became ill. He has great pain in the head, throbbing in the temples, nausea and loss of appetite. Head hot. Has not more pain on lying down. With eight leeches to the temples, a blister to the neck, some grey and Dover's powder, he soon got well.

This peculiarity may be explained, I believe, by reference to the diminished consumption of nerve-force in the recumbent position, in consequence of which the vaso-motor nerves are able to keep the vessels better contracted. On the other hand, in the following instance, the peculiar attacks seem to have been promoted by the recumbent posture. H. H—, æt. 26, a sufferer from subacute rheumatism, but rather inclined to plethora, has seizures which he describes as follows:—They begin with a sense of fluttering at the heart, and a feeling of fright, then all the blood in his body rushes to his head, which throbs violently, and seems full, as if bursting. This state lasts five to ten minutes, during which he cannot move at all, tries to move, but can't, is, however, quite conscious. The attack subsides spontaneously. It always occurs at night while he is lying down. The disorder in this case was, I believe, of epileptiform character. The recumbent position induced hyperæmia of the mesocephale, which caused hyper-excitability, expressing itself in a temporary spasm of the nerves of the cerebral arteries, and disturbance of the heart's action, succeeded before long by an apposite state of arterial relaxation. Graves ('Clin. Med.,' p. 775) mentions the case of a lady of rank who was occasionally attacked by violent determination of blood to the head, and each of these paroxysms was sure to induce before it ended a violent propensity to suicide, which she very nearly succeeded in gratifying on more than one occasion. This propensity, and the cerebral congestion which caused it, were afterwards removed, or rather prevented, by the timely application of dry cupping as soon as the well-known premonitory symptoms of the paroxysm made their appearance. In Cases 4 and 5 the pathological condition was essentially different from what it was in 6. There was active hyperæmia no doubt in all three, but in the first two it depended solely or chiefly on relaxation of the arteries, or vaso-motor nerve paresis; in the last it was the result of irritation of the cerebral tissue, and was produced by a *vis à fronte.* It is evidently a most practical matter to distinguish cases having one origin from those which have a different. The treatment must be determined by the diagnosis, and, in some cases, it is by no means easy.

The history, duration, and causation of the malady are our principal guides. If there has been any injury, great mental excitement, or anxiety, if the existence of tuberculous or syphilitic deposit is probable, if the symptoms have set in recently and acutely, if depletion and purgation are of service, we must regard the hyperæmia as produced by the state of the brain tissue itself, and not by paresis of nerves and vessels. If, however, the disorder is of long standing, has been preceded by weakening disease, and is amended by stimulants and tonics, it has undoubtedly a different origin.

Too much stress can hardly be laid on the importance of distinguishing true hyperæmia from mere passive congestion, which must be regarded as an essentially different state, and to be dealt with chiefly by removing causes of obstruction to the return of venous blood.

CHAPTER VI.

SPINAL HYPERÆMIA.

The spinal cord is evidently very differently circumstanced compared to the chief mass of the encephalon with regard to its supply of blood. That furnished to the latter is very abundant, and this large amount appears to be necessary for the due performance of its special functions,—a failure or diminution of the supply being immediately felt, while on the other hand an overflow has equally injurious effects. In the case of the spinal cord these variations seem to be of much less moment, and we can by no means point with so much confidence to morbid results produced by them. No doubt the phenomona of meningitis and myelitis, or apoplexy are evident enough; but these affections do not come within my plan, as they involve actual organic change. With regard to spinal hyperæmia much importance has been attributed to it by various Continental writers of an older date as the cause of numerous morbid phenomena. Frank imputes certain pains of the back and lower extremities, certain sciatic neuralgias, certain species of lameness, diverse tremors and convulsive movements, stupor, or paralysis of those extremities as well as several epileptic and tetanic phenomena to congestion and distension of the vertebral sinuses and veins (Ollivier). Ludwig also views the very acute dorsal pains which so often exist in severe intestinal colics, and the pains in the back and limbs which occur at the onset of fevers as depending on a like condition. Portal explains convulsive and paralytic affections of the extremities occurring in various inflammatory diseases by congestion of the spinal vessels. Ollivier relates the following case. "I examined the body of an individual who had been affected with incomplete paralysis in the movements of the trunk and extremities with morbid exaltation of the cutaneous sensibility. This paralysis . . . had gradually diminished and was nearly gone, when it again appeared simultaneously with a pleuropneumonia. This latter disease made rather rapid progress, and the paralysis was observed to go on increasing till his death; so that a few days before he died the patient had relapsed into the same state of paralysis with extreme sensibility of the integuments. The upper and lower extremities performed but very feeble and general movements; respiration was extremely painful, and the movements of the chest were almost imperceptible. He preserved to the last the free use of his intellects. At the post-mortem we found rather extensive pneumonia and pleuritis of the right side; there existed at the same time considerable sanguineous congestion in all the meningo-spinal veins, which were manifestly dilated. The nervous cords were enveloped in a collection of veins very much gorged with blood, which evidently compressed each spinal nerve at its exit from the spine, a circumstance which perfectly explained the phenomena observed during life." Another case is related (from Dance), the subject of which was a female, æt. 31, who a month after a favorable confinement was attacked with formication of all the limbs, which speedily became paralysed, while sensibility remained. The respiration became difficult and she died asphyxiated on the second day, having been bled twice. A very careful examination showed nothing abnormal in the brain or cord. All that could be detected was some red points on the cut surface of the brain, and slight infiltration of the cellular tissue of the spine external to the dura mater. The organs were all sound. O. explains the paralysis by the assumption of a congestion, which disappeared after death. This assumption seems to me quite inadmissable, for the death was of that kind which specially tends to increase and perpetuate venous congestion by reason of the impediment to the return of the blood to the right heart. There was just as much reason for finding the venous plexuses gorged in this case as in the preceding, and I must think the explanation of the paralysis in both is erroneous. The loss of motion alone cannot be explained so far as I can see by the congestion, as the distended veins would press equally on both anterior and posterior nerve-roots. Nor can I admit that the cord, surrounded as it is by subarachnoid liquid, is at all more likely to be compressed at its anterior than at its posterior part, because the former is nearer to the wall of the canal. These cases afford a good illustration how much more prone we are to be impressed by the visible than by the invisible, though the former may be very inadequate to account for the phenomena. A case which ended in recovery is given by the same author. The patient, æt. 38, led an active and laborious life, but was habituated to alcoholic and venereal excesses. The latter especially induced a pain in the loins and trembling of the lower extremities. For two months before his attack he had general debility of the legs and wandering pains, yet followed the same mode of life. It was not surprising that paralysis of all the limbs, and of the erector spinæ muscles should have ensued with some numbness and sense of formication. Venesection was useless, and after the application of twenty leeches to the back the paralysis became complete. After four blisters there was some improvement, but nux vomica given in gradually increasing doses was of no avail, and was discontinued; only dry frictions to the spine and to the extremities were occasionally employed. After three months' illness the paralysis entirely disappeared. The cause assigned for the paralysis by Ollivier is the recurrence of sanguineous congestion, and increased exhalation of the vertebral liquid. I cannot but think that a more natural and truer reading of the case is that the essential pathological condition was exhaustion of the nerve-power of the cord, which with rest was gradually restored. On reviewing the above cases, which seem to be fair specimens of the kind in question I cannot but join with Abercrombie in feeling considerable doubt how far spinal hyperæmia (venous) is ever a cause of failure of the functional power of the cord. Arterial (true) hyperæmia we may be sure would (supposing it to exist apart from actual inflammation) lead to increased activity of the nervous tissue, such as exists in tetanus and in similar states. It is impossible however to separate the effect of the hyperæmia in such instances from that of the agent, as strychnia, which has induced it. Duclaux[1] has recently described as spinal congestion various phenomena, which were produced by excessive heat, and which were evidently very similar to those of heat apoplexy. Patients were suddenly attacked with headache, muscæ volitantes, general cyanosis, and derangement of the digestive functions. Insensibly and in a short space of time there occurred a failure of strength in the limbs, substances held in the hands were permitted to fall listlessly to the ground, and the gait became uneven and irregular; there was giddiness and frequently syncope. Pain was commonly complained of at different parts of the vertebral column. Antiphlogistic and purgative treatment was usually successful, especially mercurial friction along the spine. Blood-letting was seldom required. The symptoms in these cases appear to me to have depended much more on a state of paresis, of exhaustion and enfeeblement of the nervous tissue than on active hyperæmia. The morbid influence of heat is invariably depressing. It is very possible that active hyperæmia did occur secondarily to some amount, and the results of treatment go to prove it, but I cannot view this as the primary morbid change.

---

[1] 'Lond. Med. Gaz.,' Aug., 1860.

After having carefully considered what has been advanced on the subject of spinal congestion since the above remarks were written I find no reason to alter the views then expressed. There is no post-mortem evidence at all sufficient to prove that the supposed cause is a real one. The appearances which have been noticed are admitted to be "very vague and unsatisfactory." On the other hand when well-marked signs of spinal hyperæmia have been found on dissection the symptoms during life have been not unfrequently very different from those enumerated as belonging to this condition. In about half of Dr. Ogle's fatal cases of chorea the spinal cord or its membranes were found congested. In two cases of tetanus examined by Mr. Lockhart Clark, there was considerable congestion of the cord. In these instances the hyperæmia was secondary, and depended on the unnatural excitement of the cord, but nevertheless it is evident that the latter condition and not paralysis is the usual accompaniment of hyperæmia. The same I have no doubt would be the case if the hyperæmia depended on arterial paralysis, at least, until the disorder had proceeded to actual inflammation. The analogy which we may take from cerebral hyperæmia induced in this way is very corroborative of this opinion. In the hot stage of ague, when the arteries are everywhere dilated, paralysis is an exceedingly rare occurrence. In fact, both in the brain and in the cord there is much more ground to look to anæmia than to hyperæmia as a cause of paralysis.

As regards passive hyperæmia, when we think how often the tributaries of the vena azygos major and lumbar veins must be highly congested in heart disease, and in sundry other states, without any paralysis or any other spinal cord symptom resulting, we cannot rate it as having any important influence in the causation of the symptoms which might be attributed to it.

It may be remarked that the disorder termed spinal irritation is regarded by some of our best authorities as dependent on hyperæmia of the cord or its nerves at their origin, and to be best treated by local depletion and blisters. The symptoms of spinal irritation are however very different from those assigned to spinal congestion.

LEEDS SCHOOL OF MEDICINE

CHAPTER VII.

CEREBRAL PARESIS.

By this term I mean a state in which, without demonstrable organic change, there is greater or less enfeeblement of the functional power of the brain. Perhaps the simplest instance of it is when after much exertion of mind or body we feel incapable of any sustained mental effort. By repose the functional power in case of mere fatigue is early restored, but in various morbid states repose alone is insufficient. Prolonged extreme mental exertion may induce such a degree of paresis as to constitute dementia, and the same may result from any severe mental shock. The non-dependence of this state on actual organic alteration in some cases is evidenced by the temporary restoration of the intellectual power under stimulants, as wine. Paresis may affect any or all of the cerebral functions, either the intellectual, or the voluntary motor, or the sensory. The liability to paresis will vary much according to the original vigour and endowments of the individual, and also according to the wear and tear to which he has been subjected. The phenomena of cerebral paresis are, of course, very varying, but all bear the stamp of debility, mingled it may be, in certain cases, with indications of abnormal excitability. In many instances the phenomena of primary cerebral paresis and of general anæmia will be very similar, the anæmia in fact being the cause of the failure of power. Paresis, however, is most often quite independent of anæmia. In some cases paresis of the brain seems to be the reflex of inhibitory irritation.

Instead of attempting to give an abstract description of the state in question I propose to record briefly the leading features of various cases I have met with, which as actual occurrences seem to me more impressive than any general statement. A lady, æt. 80, of strong constitution, calm mind, and energetic disposition, had a moderate attack of influenzal catarrh. In this she had the following symptoms referable to the head. She lay in a dozy, torpid state, the stupor being so marked that she could hardly believe she had not taken opium. If she did not get her food when she wanted it she felt as if her understanding were leaving her. Bark and ammonia with wine benefited her, but even some days later, when convalescent, she could only lie quite still, without speaking or doing anything, and felt as if she had no use of her mental faculties. The pulse was intermittent, but not specially weak. This was an instance of simple paresis of the hemispheres. F—, male, of middle-age, stout, is attacked suddenly one evening with faintness, giddiness, severe retching and vomiting. He could not stand, and his head felt as if it did not belong to him. He had felt unwell during the day, but the faintness, giddiness, and sickness came on all in five minutes. There was no epigastric tenderness, no headache, no pain, but drowsiness. He could not raise his head, except for a short time, when he was sick. In four or five days the sickness had subsided, and he was gaining strength, but was only just able to read, and his head was still very apt to be giddy on any quick motion. His tongue was clean all the time, and his pulse not at all weak correspondingly to the peculiar debility of the head. Under a tonic treatment he recovered, but it was long before he lost the tendency to giddiness. In this case it is clear, I think, that the brain was affected by a stroke of influenza, which partially paralysed its action, and, perhaps, also that of the vagi nerves. There was no indication of cerebral anæmia; the giddiness seemed to be the result of direct debility, which continued for a long time. R. F—, æt. 17, male, admitted January 28th. He complained of stupidness, nervousness all over, a great sense of weight at the vertex, and great sleepiness. Functions in fair order. With ammonia, iron, nux vomica, and valerian he was well in three weeks. The cause of the disorder is not clear in this instance, but it is evident that the cerebral functional energy was impaired. J. J—, male, æt. 17, ill with catarrh fourteen days. Stomach disordered; memory much impaired; cannot be trusted alone; appears very nervous; speech impaired, and power of holding things in his hands; is ready to fall if at all irritated or startled. Of large lax make. In three weeks he was cured by iron, quinine, and nux vomica, after three mild aperients. F. F—, male, æt. 14, ill fourteen days.

Seems silly, strange, and very wandering, but answers questions. Pulse slow, weak. No other apparent disorder. Recovered in three weeks with quinine and nux vomica. L. W—, æt. 13, female. Health generally good, ill three weeks. Was attacked at first at 10 a.m. by a kind of fit, lost the use of her legs and arms; her speech was quite altered; she looked livid, and, according to her father's account, appeared "taken for death." She did not recover consciousness by the evening of the day on which she was attacked. At the time of her admittance she had, in great measure, regained the use of her limbs, but still could not dress or undress herself; she often complained of pains in her arms, more in her head. She recovered with iron, quinine, cod-liver oil, and nux vomica in eight weeks. In the last three cases the symptoms indicate that the brain had been affected by some depressing influence interfering more or less seriously with the exercise of its functions. Of the nature of this influence there is no certainty, but it seems a probable conjecture that it is some miasm akin to that which produces epidemic catarrh. The length of time during which the morbid phenomena continued makes it certain that they were not of epileptic or syncopal character. Neither is there any indication of their resulting from reflex inhibitory irritation. I have chosen to record the above instances not because I think them very unusual, but because their import scarcely seems to be appreciated by practitioners generally. It is to my mind a capital fact in neuro-pathology that the great nervous centres are liable to have their functional power so seriously impaired by obscure (atmospheric and other) causes, apart from any organic lesion, or manifest cause of debility. It is clear that the nervous centres may be vexed and depressed by the same kind of agencies that harass the nerves. They may also become gradually debilitated from various causes till they give way in a sudden collapse. This should be borne in mind in dealing with all obscure cases of central affection.

Dr. Moorhead has recently recorded an highly interesting case of this kind, where there is no evidence of the operation of any special miasm. The patient, a male, æt. 62, was strictly temperate, but overtaxed his mental powers in the business of his avocation. Some time before he was taken severely ill, he complained of difficulty of breathing coming on in paroxysms without cough; of depression of spirits, and of failure of memory. The attack commenced with delirious excitement, considerable impairment of hearing, confusion of ideas, and inability to recognise the members of his family; subsequently, as he became worse, the pulse became very feeble and small, the dyspnœa very frequent and distressing; he was perfectly comatose, with occasional hiccups; his evacuations were passed in bed, and the power of swallowing was much impaired. There was no nausea or vomiting, or severe pain in the head; the pulse was not slow. The urine contained no albumen or tube-casts, and the sp. gr. was good—1023. The treatment employed was eminently stimulating and supporting; for a few days, when the coma was profound, ℥iss of brandy was administered in beef-tea every two hours, while gr. x of ammon. carb. were given every four hours. The grand object was to stimulate the capillary circulation; a blister to the neck, and sinapisms to the legs were applied with the same intention. On the fifth day he was much improved, and two days later he continued rational, but laboured under an impediment of speech, being unable to find suitable words to convey his meaning. He still had a feeling of uneasiness in the head, with irritability of temper. Recovery seems to have been complete. Dr. Moorhead believes that the symptoms arose partly from anæmia of the brain, and partly from undue waste of brain-tissue accompanying long-continued mental exertion. He well points out that his patient had become gradually anæmic, and remarks how often do we see cases of extreme anæmia thus gradually induced in which the cerebral functions are comparatively unaffected. He grounds on this his view above cited that one element of the disorder was exhaustion of the power of the cerebral nerve-cells. In this I quite concur, and, indeed, regard it as far more important than the anæmia. The latter could not, especially in an aged person, be repaired in the few days which sufficed for the removal of the urgent symptoms. On the other hand, the nature of the "juvantia" makes it clearly apparent that simple loss of power, functional paresis, was the essence of the malady. Cases of the same kind, though less severe, are by no means unfrequent, and it is evidently of the greatest importance to appreciate the phenomena correctly, and not to be misled into supposing that they indicate congestion or effusion—those great scapegoats of cerebral pathology—when they simply imply exhaustion.

The following history will be read with interest as the experience of a skilled and eminent observer, from whom I received it. A gentleman, æt. 43, had been suffering a good deal with brain weakness for some months, the result of overwork, and was getting worse. He could not write a letter now in the evening without suffering, and was obliged to dictate. Last night he scarcely slept at all. His brain gets into a peculiar condition when he lies down, which he describes as consisting of a most rapid succession of unconnected ideas, with a feeling as if his cerebral convolutions were sensitive, and there was a constant hurry and tumbling over in his brain. The same tune keeps constantly recurring to his consciousness for a long time together. He fears that he shall become insane. A slight degree of lower position of the head brings on or increases the disorder. He has suffered in the same way before, but then if he took a glass of wine at night the distress rapidly ceased, and he would be asleep in five minutes. Now wine does not benefit him. When his head is suffering at night in bed as above described, he is partially asleep, yet is able to ascertain that his pulse is very rapid; if he thoroughly wakes up his pulse falls to its usual rate, which is slowish. He feels very seedy, has much sense of pressure at vertex. Morphia agreed with him pretty well, but he had to take it early in the day in order to get sleep from it at night. At present I know that he has regained the full power of his very able brain; the improvement commenced after a rest in the country, and was perfected by judicious management and abstinence from overwork, with little aid from medicine. The salient points for notice here are—(1) The induction of a morbid cerebral activity by excessive fatigue. The natural result should have been temporary languor and dulness, but this slightly morbid state was replaced by a different and more serious, because more exhausting condition, which had no tendency to recruit lost vigour as the former would have. Here is the great evil of delirium, it comes of exhaustion and increases it. (2) The sensation of the brain-surface itself becoming sensitive, which is normally void of any such quality. This has its analogue in the cartilages, the stomach or other internal organs becoming hyperæsthethic under disease. I once met with a patient, æt. 70, in whom this state was very marked; he suffered, as he said, with "a soreness of the brain;" any motion jarred and hurt his head, or rather its contents, but there was no tenderness on tapping. His intellect was clear, but he was hyperæsthetic. He had never had a fit, but once a threatening "as if he had almost lost his senses." There are a few nerves in the dura mater, but it does not seem to me that the symptom in question can have its origin in any morbid state of these. (3) The good effects of wine in the lesser degree of the malady, and the cessation of this when it became aggravated. (4) The acceleration of the pulse during sleep probably from paresis of the cardiac branches of the vagi. (5) The utility of allowing time for the stimulating action of morphia to pass away. (6) The aggravation of the cerebral dysæsthesia by a position of the head which increased hyperæmia.

In the foregoing histories the failure of functional power in the cerebral hemispheres was the most conspicuous symptom, in the following that of the motor centres on one side.

Case i.—A. H—, æt. 24, female, admitted August 21st, 1863. She had been confined nearly twelve months, had suckled the child twelve months all but a week. Recovered well from her labour. About August 7th she began to find the right arm and leg getting weak, got gradually worse until she can now (September 1st) only move the fingers of the right hand a little, and barely stir the leg a very little. The left leg is nearly as paralysed as the right: it became affected about a week after the right. No loss of sensation in the paralysed limbs; no reflex movements. Some aching of the legs. Before the paralysis came on found herself getting very weak, anything put her out very easily. Has had no pain in the head nor loss of consciousness. The limbs are wasted. Had plenty of milk on admission. Feels quite well except being very weak, can read and attend to matters. Feels so faint at night and morning. She had bark and ammonia, strychnia, iron, and wine, and was galvanised, but at the last date, October 17th, she had improved very little. I cannot doubt that this was really a case of functional paresis from the exhaustion induced by suckling too long. I ought to have had a note respecting the heart's sounds to answer the suggestion of embolism. There is, however, no reason to think there was any cardiac disease, and the extension of the palsy to the other leg makes it to my mind particularly unlikely that any such cause was in operation.

Believing with our best authorities that insanity depends on some disordered action of the cerebral hemispheres, and is therefore a bodily disease, standing quite on the same footing as other diseases, I have no hesitation in citing instances from the experience of alienist physicians in support of the general doctrine I am advocating.

Dr. Maudsley records two cases of sudden acute dementia occurring as a primary disease of unknown causation, though apparently connected in some way with disturbed sexual functions. "The first is that of a pale, delicate, fragile, blue-eyed, young lady, æt. 25, who came under his care when she had been ill a week. She had not taken food and was much exhausted. Her vacant wandering eyes were devoid of all intelligent perception, and her countenance was blank and expressionless. There was a restless agitating movement, to and fro, of the body generally, and of the head in particular, with a low monotonous moaning. She was speechless, and it was impossible to elicit any kind of response, or to fix her attention. She took no food save what was forced into her mouth, and was inattentive to the calls of nature. Before three months were over she had completely recovered under appropriate treatment. She had suffered some disappointment of her affections; menstruation had ceased, and acute dementia followed." Another somewhat similar case was that of a young gentleman, æt. 19, of pale delicate appearance, with large prominent grey eyes. He had for some time been employed rather hard in an office, and had not quite satisfied his friends with his conduct out of it, when one day he was suddenly seized with a quasi-hysterical attack of incoherency. There was blank confusion of mind; he neither uttered nor expressed otherwise anything indicating ideas in his own mind, and he was unconscious of what was said by others, and of what was going on around. There were occasional periods of confused excitement. He took no food except it was forced upon him, and was inattentive to the calls of nature. His head had been leeched in order to subdue the supposed excitement, and he had in vain taken the most drastic purgatives in order to remove an obstinate constipation. Brandy, eggs, and beef-tea, removing the exhaustion, soon subdued all excitement; a simple enema of castor-oil produced full action of the bowels, and within a month he quite recovered his senses" ('Lancet,' 1866, April 7th). Dr. Maudsley adds that when patients recover they do not remember anything of their state; the mental functions having been suspended or paralysed.

In the following case the cause of the disorder was not far to seek.

Case 2.—Mrs. P—, æt. 48, broad and fat, seen July 24th, 1862. Has always been a weakly-nerved person, has had ten children. For six or seven years has suffered with bleeding piles. Her first attack of head symptoms was in October, 1861, the second in April, 1862. She did not lose consciousness in either, but had pain at the top of head and backs of eyes. She recovered from the first attack in six weeks, from the second she still suffers. Complains of burning heat at top of head, at times has pain and great heat of head, the pain is increased by the recumbent position. Feels some numbness in both hands along the back of the fingers. Has double vision from paralysis of the right external rectus muscle. Head not tender. Pulse of good force. Does not feel weak. With strychnia and citrate of iron and quinine the external rectus regained its power, and I lost sight of her after October 23rd till March 17th, 1863, when she returned to me feeling very weak, languid, and incapable of exertion. A week later the paralysis of the external rectus was complete. Much hæmorrhage had been going on from the piles. She had great pain at the right posterior part of head, increased on lying down. The double vision caused her much annoyance from the objects passing her in the streets confusing her. Her piles were now got rid of by operation, but the hæmorrhage from the bowel continued whenever she had a motion, and the state of the right eye was unchanged. Nothing could be detected in the rectum to account for the bleeding except a loose and baggy state of the mucous membrane. This was at last arrested by tannin taken internally, aided very materially by removal to the country, where her general health and strength much improved. By the middle of June she had regained a good deal of power over the external rectus. I urged a return to the country, but this was not carried out; however, the improvement continued, so that November 10th, when I last saw her, she had almost perfect power over the formerly paralysed muscle. Some bleeding had recurred, but not to any great extent. *Remarks.*—This case is an interesting example of a limited paresis of the nervous centres, involving the origin of one small nerve only. That the paralysis did not depend on organic disease must, I think, be admitted from the beneficial effect of strychnia, iron, and quinine on the first, and of country air on the second, occasion. There can be little doubt that the long-continued hæmorrhage was the cause of the general debility and local paresis, but it is remarkable that the latter existed before the former was felt to any notable extent. The pain in the head was probably neuralgic, yet it was aggravated on lying down. Enemata of krameria infusion, lead and opium pills, and sulphur internally failed to arrest the bleeding after the piles had been removed. The case is instructive in various respects, as showing (1) the connection between debility and paresis; (2) the necessity for close inquiry into the possible causes of paresis; (3) the superiority in some instances of a pure air to tonic medicines; (4) the dependence of hæmorrhage in some cases on atony of vessels.

To my own mind such histories as the preceding are sufficiently conclusive of the occurrence of such a condition as cerebral paresis; but others may desiderate autopsies, two of which I can furnish. Bamberger (*v.* 'Brit. and For. Med.-Chir. Rev.,' April, 1856) records the case of a girl, æt. 20, previously in perfect health, who was admitted into Prague Hospital, in January, 1850, having the evening before been seized with vomiting followed by universal convulsions, and unconsciousness, brought on by the information that her lover had proved faithless, which she had received the morning of the same day. The temperature of the surface was elevated, the pupils unaltered, the eyes closed, the face pale, respiration stertorous, and the pulse intermittent. There was occasional spasm of the extensors of the upper and lower extremities, and also of the abdominal muscles. The limbs when raised and allowed to fall descended as if lifeless, though not actually paralytic. There was no return of consciousness, and she died twenty-eight hours after the seizure. At the autopsy the brain was found pale and anæmic; the walls of the left ventricle of the heart were slightly hypertrophied, the aorta very narrow, and its coats thin; the heart and large vessels were full of loose coagula. All the other organs were perfectly healthy. No suspicion or any evidence of poisoning. If this case had been a chronic one objection might be taken to the absence of microscopic examination, but under the circumstances it seems extremely improbable that any minute textural change would have been discovered. The attack was acute, so that no chronic lesions could have existed, and any of recent origin could hardly fail to be evident to the eye.

Case 3.—G. R—, æt. 33, was admitted under my care, February 15th, 1867. His wife stated that he was perfectly temperate. He had not been quite well the last two months, but had not been laid up entirely until the last three days. His earlier symptoms consisted in tickling cough with some expectoration, and some rheumatic or gouty swelling of the dorsum of the feet. A fortnight ago both hands were numb with sensation of needles and pins; one hand was affected one day, and the other on the next, then the disorder ceased. The last three days he has been as he is now, very drowsy, and not conscious at all times. Has suffered with pain in the head the last fourteen days, much worse the last five. The pain is referred chiefly to the forehead and right temple, is felt severely, when he coughs his head seems to open and shut. Is remarkably anæmic. Has had much cold sweating at nights lately, without shivering. Is in a state of very marked stupor; can be roused a little, but refuses to show his tongue or open his mouth. The day following the stupor was less, on the next the pulse was 100, distinct, respiration 34, temperature 98°2. The twenty-four hours' amount of urine was 40 oz., sp. gr. 1037, highly saccharine. The right arm was quite palsied as to motion and sensation. In the region of the deltoid the skin was sensitive, but the hand was quite anæsthetic. He was drowsy, but quite capable of being roused; spoke intelligently; told me that the right arm was only paralysed this morning. Complained of pain in the head. At 11 p.m. he became worse, early in the following morning was quite comatose, soon after was convulsed nearly equally on both sides, and died at 8 a.m. At the autopsy it was noted that the body was spare, the rigor mortis was well-marked. The membranes of the brain were perfectly healthy everywhere; the large arteries at the base were empty and free from emboli. The grey convoluted surface was pale; the subarachnoid fluid rather abundant; the puncta vasculosa very few; the whole organ decidedly anæmic. Every part down to the medulla oblongata was carefully scrutinized, but there was nothing whatever morbid to be discovered. A careful microscopic examination was made of portions of both corpora striata, of the pons varolii, and of the medulla oblongata, but nothing morbid was found except some atheromatous deposits in the wall of one vessel in one of the corpora striata. There were tubercles in both lungs, a cavity in the left. All the other organs were fairly healthy. I am disposed to regard the saccharine urine in this case as a consequence rather than as a cause of the nerve disorder. The patient could not be said to have suffered seriously from diabetes, and consequently the symptoms can hardly be imputed to exhaustion resulting from the drain. On the other hand we know from experiment that lesions to the nervous matter at the base of the fourth ventricle will give rise to saccharine urine, and it is quite possible that this region was involved in the functional disorder. Whichever view we may take the history affords proof that coma, convulsions, and paralysis of one limb may ensue from obscure causation in the absence of uræmia. and of any demonstrable alteration in the brain.

The following case is one of great interest:

CASE 4.—A male, æt. 60, very stout, seen April 4th, 1867. His history was as follows:—At age of 19 he had typhus fever, and was very ill indeed. Twenty years ago he used to suffer from fulness and heaviness of head, could not bear a hot room. Had an attack of sciatica eleven years ago; had no such disorder at that time as at present. No gout in family, never had it himself. Used to be very bilious a few years ago. The malady for which he sought advice came on annually, but I omitted to ascertain how many years it had occurred. During about half or rather more of the year he was very fairly well, enjoyed life thoroughly, took his food well, and was very active; this condition existed during the summer, autumn, and early winter. He begins to droop about February, gets languid, extremely low-spirited, fancies that everything is going wrong, that all those about him are pilfering his property, is sleepless, without appetite, and his urine becomes very turbid and thick. His complexion alters, his eyes get very dull, his bowels costive, all his nerves are very tremulous, "he seems as if in a dancing state." Is always worse in mornings. The change in his health begins very gradually, is marked chiefly by a change of mental character; when well he is most decided, when ill he is utterly without capacity for business, or energy, or decision. Can't bear his most intimate friends when he is ill, in fact, his condition is then altogether, and in every respect the opposite of what it is when he is well. Last year he had hysterical attacks, made noises that were hardly human, refused food; when he was recovering houses appeared to him upside-down, and his friends' faces not as usual. In the hysterical attacks he struggled strongly, and was quite unconscious. Extreme mental irritability of temper is a feature of his condition when ill. He is at present most suspicious, and extremely irritable. Has some pains occasionally in his back. After the hysterical attacks he was quite unconscious for days, passed his evacuations under him, and refused food. He is always worse in mornings. Heart's sounds normal. The liver extends some little way below the ribs, but it is not easy to say how far. Spleen not enlarged. Tongue clean. Pulse 87, sitting. No piles. Not anæmic. Appetite not good, but he takes meat. Keeping his bowels open seems beneficial. Urine of full colour, soon gets turbid with lithates, sp. gr. 1032, when boiled with NO_5 turns almost black. Total amount in twenty-four hours, 29½ ounces. Total urea, 672 grains. Crystallizes spontaneously with NO_5. On standing, much crystalline uric acid is deposited, and some octohedra. I advised him to take three ordinary meals and one third of a bottle of Burgundy daily. Camphoræ gr. j + extr. colchici acet. gr. iss *o. n.*, and magnes. sulph. ʒss + quin. disulph. gr. j + strychniæ gr. $\frac{1}{24}$ + spt. myristicæ ♏xx + aq. ℥j *bis vel ter die.* The dose of strychnia was afterwards increased to gr. $\frac{1}{20}$, and of quinine to gr. ij, and acidi nitrici ♏iij added. By May 9th his health was much better, but he was worried by business matters. In 1868, June 16th, I learned that he was perfectly well and had been so ever since.

The point which this case seems especially to illustrate is, the influence of the declining winter or early vernal season on the body as a cause of disease. It is not too much to say that it completely changed this man for the time. Its influence on gout, on ague, and some other maladies, is very similar. Phthisical patients decline rapidly about the same time. How this is we can but guess. It may be that the lessening of light during the winter season diminishes the vitality of the system. Whatever be the explanation, the cause is a real one, and I draw from the case the lesson that in cases where any tendency of this kind can be traced we ought to be on our guard, and endeavour by all precautionary means so to fortify our patients' health during the previous autumn and spring that the breakdown may be averted when the time of trial arrives. A well-used autumn holiday, plenty of outdoor exercise in the winter, tonics, and regulation of the secretions, if necessary, may prevent a malady which much physic will hardly cure. The nerve disorder in this instance was primary, I believe, and produced the unnatural state of urine. The excessive darkening of the urine on boiling with nitric acid is not unfrequent in states where the nerve power is gravely depressed, but it is not constant, and is not peculiar to any. It implies, I believe, rapid destruction of blood-globules.

The following quotation from Mr. Austin's work 'On General Paralysis' affords a well-marked example of the production of cerebral paresis, of the most complete kind, by remote irritation. The paresis in these cases is of inhibitory character, and is the result of two factors, viz. on the one hand the impaired state of the vis nervosa in the encephalic centre, and on the other the intestinal irritation. That the paralysis is not the result of spasm of the cerebral blood-vessels is apparent from the gradual manner in which recovery takes place in most instances.

"A recognised paralytic is suddenly found completely hemiplegic. The fit, which usually happens in the night, is unattended by shriek or scream, and is frequently free from convulsion. It is accompanied by semi-coma and suspended utterance, and often announces itself to the attendants or to the sufferer's fellow-patients by loud teeth-grinding, or by the seized person falling out of bed. Then the neighbours find he has fallen because an arm and a leg are powerless. Frequently the paralytic who may have been retained in bed by the well-tucked-in clothes is only discovered to be hemiplegic when the attendant comes to get him up in the morning. When he comes under medical inspection he is semi-comatose, his utterance is in abeyance, he is quite hemiplegic, but with sensation only slightly impaired. If the arm or leg be pinched vigorous movements of the affected limbs ensue. Though sometimes apparently insensible to all going on around him, there is frequently a hopeful glimmer of intelligence in the eye. The mouth is rarely distorted, and the movements of the eyeball are more perfect than might have been expected. The pupils are more unsymmetrical than usual. An attendant now administers an injection of eight tablespoonfuls of common salt dissolved in a pint of warm water. In nine cases out of ten, in at most an hour, a copious stool is the result, composed of small, hard, quite distinct rounded lumps. After an evacuation of this kind I have known a person quite hemiplegic at 2 p.m. recover a free mobility of the arm and leg by midnight. Usually, however, several similar enemata and their resulting stools are required before an approach to the ordinary movements of the limbs is obtained. Occasionally castor oil, and calomel + colocynth are employed the sooner to clear out the intestinal tube, or at least the large intestines. The object of these simple remedies is not, by serous evacuations, to derive from the head, but simply to expel the hardened fæces, of which the colon is full, and which I regard as the eccentric cause of the seizure. The cause removed, nature, aided by a moderately generous diet, will soon restore the affected limbs to their former condition. Such measures as blistering, cupping, leeching, purging, and the like, are not only superfluous, but, I believe, in the highest degree prejudicial during these seizures. At any rate, without their exhibition I have seen nearly weekly rapid recoveries from the completest hemiplegia. Under injections, castor oil, a pill of col. c. calom., in a day or two the patient's leg begins to move, and his utterance for monosyllables to return. Later the movements of the arm commence, and the memory becomes sufficient to enable him to recognise and name correctly those around him. Day by day the amelioration proceeds; and I have frequently seen a person, hemiplegic for the first time a week previously, again walking, and with his former gait, in the infirmary. Usually, however, two to three weeks may elapse before the patient quite regains his former mobility. During this time all that is required is simply to watch, and gently to sustain the peristaltic action of the intestines."

Dr. Palmer has favoured me with the following interesting cases, which seem to me plainly of reflex inhibitory nature.

CASE 5.—H. A—, æt. 67, coachman, admitted May 30th, 1869. Was quite well until 29th, when he felt a little twitching on the left side of his face and in his left leg. At 6 a.m. of 30th, when he woke up, having drunk too much over night, he felt as if he should choke; he could not speak, and he could only move his left arm and leg imperfectly. His head ached, especially across the forehead. Dr. Palmer saw him at 2 p.m. of 30th. He was then lying in bed; eyes open; cheeks puffed out in expiration; all but perfectly unconscious; opened his mouth when shouted to, but did not put out his tongue; feebly moved the right arm when asked; left arm totally paralysed; state of leg not observed; was totally unable to speak; gave no evidence of understanding questions; had made signs to his wife fifteen minutes before that he wanted to pass urine. This condition came on gradually after he went to sleep at 7 or 8 p.m., when he was conscious, but stupid; drank some tea before he went to sleep; sweated profusely during sleep; pulse, when seen by Dr. Palmer, full and strong; face flushed, and temporal arteries beating strongly; pupils normal; no squinting. He was admitted into St. Mary's May 30th, when Mr. Owen reports that he found total paralysis of left arm and leg, and unconsciousness. Mr. Moore reports (apparently after his recovery) that though he could not speak he could hear and understand all that was said. His breathing was stertorous, and he could not protrude the tongue. His wife observed that he always feels better after he has been sick. An emetic, gr. 30 zinci sulph., was given, and a blister 4×5 applied to back of neck. Five hours after, he could speak and move his arms and legs; had no relapse, and was discharged June 3rd. On May 31st pulse was 60; temperature 98·1. The urine on June 1st was sp. gr. 1015, not albuminous. His health had been good, with exception of occasional attacks of rheumatism or gout in his fingers and toes, and three accidents with horses, each of which laid him up two months. This case had a very threatening aspect at first, and, taking into account the patient's age, was most reasonably regarded as the result of cerebral hæmorrhage. The observation made by the wife, however, fortunately led to correct treatment; the blister was probably unnecessary.

Case 6.—A. B—, æt. 63, a temperate male, free from rheumatism, gout, or constitutional syphilis, has no teeth, but eats meat. April 4th, 1859, he was suddenly seized in the morning with left-side hemiplegia, which was almost complete. His face was pale; he looked dull and bewildered. He was laid horizontal, cold applied to his bald head, and calomel gr. iv. given. Marked improvement ensued in two hours, and the bowels acted two or three times. He felt much better, and regained considerable power over his leg and arm. Six leeches were applied to the temples, salines and aperients given. In four days all paralysis was gone. He remained well for four years, except an annual attack of bronchitis. He still ate meat with toothless gums. Early in 1863 he began to have irritation of the diaphragm, and unbearable restlessness and oppression in the early morning. Subsequently his mind became enfeebled, any trifling business matter threw him into a state of agitation, excitement, and sense of impending death or insanity. Then he became the subject of severe nervous dyspepsia. Marked and complete relief was afforded by narcotics, but after a few days the effect was lost, and he was worse than before. All this time his tongue was almost perfectly natural, the bowels acted regularly every day, the head was hot, and the temporal arteries pulsated rather strongly. The cerebral irritation was justly regarded by Dr. Palmer as the analogue of the past hemiplegia. It was, however, unrelieved by a great variety of treatment, including repeated aperients, stimulants, and complete rest of mind and body, until, on Dr. Goolden's advice, a larger dose of calomel was given, followed by a powerful cholagogue of manganese. This brought away a large quantity of very offensive fæces, and the patient was permanently and completely relieved. His mental faculties were quite restored.

In the latter case there can be no question that on the second occasion the morbid impressions conveyed from the intestines affected the brain directly, enfeebled and disordered its actings.

The state of the circulation in the scalp makes it almost certain that the brain was not anæmic, rather the reverse. In the first attack it is uncertain whether the hemiplegia should be referred to arterial spasm or to inhibitory irritation. The pallor of the face and the suddenness of the seizure point rather to the former as the more correct view. If this be so we must regard the vaso-motor nerves as primarily affected in the first case, the hemispheres in the second.

In the following cases the cerebral disorder appears to be plainly referable to gastric distress, which acted in the same way as the intestinal irritation in the preceding.

Case 7.—Mr. W—, æt. 42, seen September 26th. Ill since the previous November; has been unable to sleep at night for a long time until lately; has lost flesh and got rather weak. Has very marked tenderness in the region of the stomach, particularly at the epigastrium, which has increased lately, and pain after food. The uneasy feeling in the stomach comes on in such a way at times that he is obliged to run out or move about in some way; he feels as if he should go out of his mind. Has had strong suicidal impulse while suffering from the pain. Sometimes gets relief from crying. Says he does not know whether his mind or his body is affected, but strives against it all he can. Has conceived a dislike of his best friends. Does not appear at all hypochondriacal. Is a temperate man, can't take wine or beer, but has been obliged to take several glasses of neat brandy at night to make him sleep; the brandy does not affect his head as it used, but seems to go to the stomach and relieve it. Used to have piles, but not bleeding. Bowels regular; pulse weak, quick; no tumour in stomach; liver and spleen not enlarged; lips rather anæmic; heart's sounds normal, except the second, which is not quite pure; urine generally clear, deposits a very few small oxalate of lime crystals; has much flatulence. He had a morphia-dressed blister to the epigastrium, and took a mixture of tr. cinch. + tr. valerian. + tr. hyoscyam. + ammon. carb. + inf. valerian. *ter die*, and ferri carb. saccht. *ter die*. By October 9th he was decidedly better, sleeping very well; his epigastrium was almost quite comfortable; he could take a beefsteak very well.

The following case, communicated to me by Dr. Palmer, is a striking instance of the effect of latent gastric irritation.

Case 8.—A strong well-grown boy, æt. about 13, was carried into the Western General Dispensary totally insensible, and without any history to throw the faintest light on the case; he had been found in the street in that state. He took no notice whatever through any sense, lay on his back or side exactly as he was placed, but evinced a tendency gradually to curl himself up like a hedgehog. No efforts could rouse him; his eyelids were spasmodically closed, pulse and respiration but little affected. Some form of poisoning was the only conclusion we could arrive at; attempts were accordingly made to produce vomiting, which, being successful, he threw up a huge lump of unchewed and undigested pork, immediately opened his eyes, stared about him, sat up, answered our questions, and in a few minutes walked away perfectly well. The lump of pork was so large as to excite astonishment how it could have passed either down or up the œsophagus.

This case is essentially similar to the preceding, but more acute and severe. It affords an excellent example of inhibitory action.

A gravid state of the uterus is capable of causing a great variety of paretic disorders. Dr. Lever has recorded some very interesting cases in 'Guy's Hosp. Rep.,' 1847. The subject of one of these was a lady, æt. 20, naturally remarkably for buoyancy of spirits; had been the life, not only of the household, but of the neighbourhood, and happily married. In a fortnight after marriage her disposition and manners underwent a remarkable change. From being light-hearted and gay, she sat wherever she was placed, neither turning her head nor her eyes to one side or the other; she was a living automaton; her movements were automatic; there was life, it is true, but there appeared to be no mind; pale and sanguine, her chiselled face seemed as if cut in alabaster. She remained in the same state until after delivery, but then gradually and completely recovered. In this instance, certain parts of the cerebral hemispheres succumbed under the influence of impressions conveyed by the uterine nerves, and did not regain their normal condition until the latter had completely ceased. The same author relates a case where paraplegia occurred in connection with three successive pregnancies. In the first and last it did not come on till after labour, in the second it gradually supervened about the third month of gestation, and increased until she became unable to walk or stand. After her confinement she perfectly recovered. On this occasion the lower part of the spinal cord was affected in a similar way as the brain was in the previous history. In the 'Edin. Med. Jour.,' September, 1862, an account is given of a female, æt. 36, who towards the end of her fourth pregnancy became very deaf and quite dumb, with complete anæsthesia of the skin of the face, and partial paralysis of the right arm. During the labour the paralysis disappeared. From that time, June 4th, 1859, till December, 1860, she had good health, but being pregnant again in the fourth or sixth month she had another attack, which destroyed the power of the whole of the left side. After her delivery, which was somewhat difficult, the paralysis in great measure disappeared. There does not seem to have been any renal disease, though in each of her first three confinements she had convulsions. In another case recorded in the same paper, a female, æt. 39, became completely hemiplegic on the left side about the fourth month of her eighth pregnancy, and at the same time lost almost completely the sight of the left eye. On delivery the power over the left side began to return, and by the following morning the hemiplegia had completely disappeared, and the sight of the left eye had returned. Eight years previous, about the fifth month of her fifth pregnancy, she was suddenly seized with loss of power of her right side, and with amaurosis of the right eye. Immediately after delivery, at full term, the paralysis began gradually to disappear, and ceased completely; the sight of the right eye was also partially restored, but never became perfect. Three years after the recovery of the left eye its vision was as good as ever it had been. In most of her pregnancies it appears that no paralysis occurred. In these instances one or other of the corpora quadrigemina and corpora striata were probably affected.

I am aware that in cases of this kind the urine has often been found albuminous, and the question naturally arises whether uræmia may be the cause of the paralysis, which would, therefore, be toxic. In cases of uræmia, however, such nerve disorders as occur in pregnancy—chorea, intense gastric hyperæsthesia, melancholia, temporary amaurosis, frontal neuralgia—are almost unknown; convulsions and coma are well-nigh the sole results of the intoxication. As the albuminuria disappears after delivery, it is tolerably certain there is no permanent disease of the kidneys; and it seems reasonable to regard both the albuminuria and the nerve disorder as co-effects of the gravid state of the uterus. We may believe the renal nerves to be rendered paretic by uterine irritation just as other nerves or nervous centres are. This view seems to me much supported by the fact that, as Dr. Churchill states, "albuminuria may occur without convulsions (puerperal), and convulsions without albuminuria." Spengler also relates the case of a healthy woman who was suddenly seized with blindness in her fourth pregnancy, but had no œdema or albuminuria. She recovered her sight completely on delivery at term.

The *causes* of paresis of the encephalon are all such as produce nervous exhaustion. Excessive mental or bodily toil, monotony, unhealthy malarious climates, oppressive heat, venereal excess, exhausting discharges, and influenzal miasms, are the principal. The possible dependence of the prostration on some inhibitory irritation should be borne in mind.

Dr. Sutherland says ('Jour. of Mental Science,' p. 168, 1861)—"Some forms of paralysis may be distinctly traced to excessive expenditure of nerve-force. A lady of my acquaintance suffered from paralysis of the hand for a year, in consequence of practising some difficult music on the piano during the greater part of a rainy day. A lady was kept up night after night writing imaginary despatches dictated by her husband just before he was seized with an attack of paralysis of the insane; in consequence of this excess of writing she lost the use of the index and middle fingers, and is now obliged to write with the left hand." "Sudden shocks, as is well known, frequently cause local paralysis; thus, ptosis of both eyelids was produced in a patient of mine when she heard of the intended marriage of a gentleman to whom she was engaged under more than usually painful circumstances; the ptosis of the eyelids soon disappeared, but the symptom was followed by an attack of melancholia, with a strong suicidal tendency. I need not say that paralysis of the seventh nerve is a well-known symptom of the disease of the brain from severe mental shock."

The injurious effects of overwork of the brain are well known. I should not do more than name it here, were it not that I would fain add my voice of warning to those which have already been given. Almost while I write a youth is brought to me whose father is intent on pushing him forward in his studies, unheedful, though a kindly parent, of his son's failing nervous power, as marked by an abdominal neuralgia, pallor, nocturnal restlessness, and a sense of unusual incapacity for mental exertion. Stern necessity may oblige those who are engaged in the thick of the battle of life to strain their powers beyond what is prudent, but in the case of those who are being trained for the strife all approach to such over-exertion should be discountenanced. It is sad when early promise of excellence is blighted by inevitable destiny, but much more sad if the collapse must be attributed to our own want of care. The ill effects of monotony are best illustrated by the languor, ill health, and sometimes mortal disease, which are apt to ensue among soldiers and sailors when reduced to compulsory inactivity; while cheerful excitement has an almost magical opposite effect. The melancholy chant of the Count of Toulouse[1] expresses no futile apprehension.[2] Nature, in her insatiable love of variety, in the changing seasons, and the ever-varying weather, seems to indicate clearly enough the advantage of frequent change. All experience of malaria testifies to its specially depressing influence on the nervous system; not to mention the cretins, the inhabitants of malarious districts are spoken of as feeble in body and spiritless in mind, phlegmatic and melancholy, stupid, languid, and apathetic. The action of heat in producing languor and general enfeeblement of nervous power is a capital fact, and one I have often thought is by no means sufficiently regarded. It is surely a very significant circumstance that an ordinary man can carry, without inconvenience, a heavy overcoat on a cold day, and walk much farther and faster thus laden than he could on a hot day more lightly equipped. This surely implies a much greater amount of energy in the motor nervous apparatus in the one case than in the other. A rifleman will tell you that his aim is much more true and steady in cold bracing than in warm relaxing weather. Men endued with great nervous power are capable of enduring heat much better than others. Napoleon, it is said, when in Egypt, habitually wore his coat buttoned up. The British soldiers in India in general bear the fatigue of forced marches under the burning sun of that climate better than the native Hindoos.[3] In fact, the stronger and better toned the nervous system is the more capable is it of resisting the enfeebling and enervating influence of heat. This is very well exemplified in the affection termed heat apoplexy, of which I propose shortly to take some notice.

As an imponderable influence, obscurely though unquestionably related to heat and malaria, we may notice electricity in its morbid action on the nervous centres. Dr. Radcliffe states in his 'Lectures'[4]

---

[1] "Oh dear, what will become of us?
Oh dear, what shall we do?
We shall die of the vapours if some of us
Can't find out something that's new."
'Jour. of Psychol. Med.,' July, 1863.

[2] *Vide* also an instance of the appearance of scurvy among American troops who were fairly well supplied with fresh food, but who had no active employment, and became homesick and disgusted with the service. Several died of scurvy. Several who were sick began to recover from the moment they were told they should have their discharge.—'Amer. Med. Times,' June 1st, 1861.

[3] Alison's 'Hist. of Europe,' vol. xvi, p. 71, note.

[4] 'Lancet,' February 28th, 1863.

LEEDS SCHOOL OF MEDICINE

that a continuous electrical current of low tension seems to have the power of producing temporary paralysis of a nerve or nervous centre which is traversed by it. Eckhard has shown that if the nerve of a frog's leg, prepared for the purpose, be included in a galvanic current, it is impossible to produce contractions in the muscle by acting upon that part of the nerve which lies between the poles. In other words, the part of the nerve along which the continuous galvanic current is passing, is paralysed by the action of the current. It is also a fact that the spinal cord may be paralysed by the same means. If, for example, the spinal cord of a rabbit be included in the circuit of a voltaic battery, the part between the poles may be cut, pricked, torn or even electrified, without giving rise either to pain or convulsion. Although the above-mentioned effects are expressly ascribed to low-tension electricity, it seems indubitable that a shock of high-tension electricity produces very similar, and even more, abiding. Numerous instances are on record in which individuals having been struck by lightning have suffered temporary paralysis of motion and special or common sensation, from which they recovered either spontaneously or with the aid of tonic remedies. In these cases there can be, I think, little question that the nervous tissue is directly paralysed from some molecular change taking place in its cells or fibres. I once experienced myself a severe shock from a very large Leyden jar, and well remember the overpowering general prostration I experienced, although the shock only passed through my forearm. It is impossible, I think, to conceive that any arterial spasm can explain the effects produced in this and similar instances. Certainly in the case of the frog's nerve dissected out, and remaining attached to the muscle above mentioned, there can be no question of local anæmia as the cause of the paresis. The "juvantia," also, as in Dr. Watson's case,[2] where steel and tonic treatment effected a speedy cure of paraplegia in a girl who had been struck by lightning, decidedly indicate that the paresis from this cause is one of simple functional debility.

Venereal excess is a powerful cause of cerebral paresis, as well as of spinal; few exceed it. Good Hufeland says, "It is proved beyond all doubt that nothing renders the mind so incapable of noble and

[1] On one occasion I went to sleep with the negative pole of a 40-links Pulvermacher's chain in my hand, the positive being applied to my back. In the course of the night I found my hand was quite numb, but after removing the chain the numbness soon went off.

[2] 'Lectures,' vol. i, p. 332.

exalted sensations, destroys so much all its firmness and powers, and relaxes the whole being, as this dissipation." It is not too much to affirm that a state bordering on dementia has often been produced by sexual excess, and perhaps still more frequently by solitary vice. Esquirol says that immoral habits and the use of mercury are very frequently productive of that deplorable species of paralysis which becomes complicated with dementia and monomania.[1] Dr. Sutherland states that "nothing expends nerve force so rapidly as venereal excess. Certainly the majority of recent cases of nervous exhaustion which come under my care may be attributed to this cause." It is somewhat remarkable that sexual excitement should have so pernicious an effect, for the nerves of the genital organs are by no means large, their origin is remote from the brain, and the loss of excreted matter can hardly be regarded as any serious drain on the system. The only way that I can see of accounting for the remarkable collapse which attends on any abuse of the generative faculty is that, owing to the intimate commissural connections between the lumbar enlargement of the cord, where the pudic nerves are implanted, and the superior and nobler nervous centres, the intense excitation of even a small and remote centre is communicated to the others, which as this subsides fall as much below as they have previously been stimulated above par. The depression is proportional to the previous excitement.

Dr. Sutherland remarks further (*vide* 'Journal of Mental Science,' p. 168, 1861) :—" It is curious that patients whose disease has been brought on by masturbation, after they have allowed their nervous system to lie fallow, or after they have experienced great mental emotion, will wake up, as it were, into a state of comparative rationality. Upon one occasion I very nearly failed in obtaining the verdict of a jury as to the undoubted unsoundness of mind of a patient whose intellect, having been disordered by this cause, was for a time partially restored by the excitement of the inquiry." This is very significant of the functional character of the brain disorder, the organ being capable of resuming its former action under the stimulus of excitement to a considerable extent.

Influenza is a common enough visitant among us, and familar though its phenomena be, they seem to be of no little interest. That a person should be prostrated, as occasionally happens, almost instantaneously, and remain for some days in profound debility, is surely very remarkable. Without speculating on the nature of the cause, let us simply consider how it seems to act. There can be, I think, no question that the nervous system is the one on which the stroke especially falls, and as little that the encephalic centres are prominently affected. The debility is by no means mere muscular weakness; it is described by Dr. Shapter as "an overwhelming feeling of lassitude and prostration of strength, with, in many cases, a loss of all muscular power, together with great anxiety of the precordia, and agonising fears of death." The expression of the countenance is *abattu*. There are pains in every part, sensations as of being sore, beat, and bruised all over. Pain in the temples sometimes prevents rest for several nights. Many observers have noticed the occurrence of neuralgia of the face. Apoplectic and convulsive attacks have occurred in some instances, in some also delirium, in others coma. These citations of the experience of others,[1] coinciding as they do very much with my own, may be considered sufficient proof that the cerebro-spinal centres are chiefly affected by the miasma, and that in a paralysing way. The catarrhal symptoms are, for the most part, such as indicate vaso-motor nerve paralysis, and atony of the capillary walls rather than actual tissue irritation. They, as Dr. Watson states, are not so essentially a part of the disorder as the peculiar prostration, since they are occasionally absent. It must appear to every reflecting mind as a very important and thought-exciting circumstance that there should exist such a subtle, undetectable poison or agency, as this of influenza. Standing, as it does, quite separate from the exanthemata, it links itself on the one hand closely with some of our commonest disorders, and on the other hand manifests no obscure affinity with pestilences, and with that most widespread of all maladies, malarious fever.[2] The intensity of its operation on the nervous system, and the fact that it is now, as it were, domiciled among us, makes it important to take count of it in dealing with a variety of obscure nervous disorders. It is probable that the more we come to know of disease, the more we shall find that there exist a few great distinct morbific causes, which, by acting on different parts, in different combinations and degrees, and with slight modifications, give rise to ever-varying forms of morbid action.

---

[1] *Vide* Ritchie on same subject, 'Lancet,' February and March, 1861.

---

[1] *Vide* 'Annals of Influenza,' Sydenham Society, p. 320.

[2] Various good observers, Cleghorn, Petrie, and H. Greenhow, testify to the origin of re- and inter-mittent fevers from influenzal affection.

The *treatment* of cerebral paresis must essentially consist in the avoidance or removal of all exciting causes, as well as in the employment of all means that can recreate and invigorate nerve-power. The possibility of the paresis being dependent on remote irritation should be borne in mind. If, however, as is oftenest the case, it is primary and direct, we must endeavour to act on the enfeebled centre itself. Among the means at our command, pure and bracing air, generous diet, and healthful mental excitement are, perhaps, the most powerful. The influence of the latter is often marvellous; it is really curious for any one to observe himself, and note how much more exertion he is capable of when his mind is thoroughly occupied and interested than when the occupation is distasteful. I always ask my patients who complain of failing power (not, of course, dependent on organic disease), what recreation they *like,* and *that* I send them to, as the best for them. Cases may occasionally occur where we may join Paley in recommending the manful discharge of duty as the best remedy against "sinkings and oppressions of the spirits." Under the head of food I may allude to the popular combination of rum and milk as being one of the very best restoratives that can possibly be given. A daily morning dose of it to weakly subjects is of great value, and in cases of an acute kind it may form almost the staple of the nourishment. As to medicines, our ordinary stimulants and tonics must be employed, the drug and the dose being matters for consideration in each individual case. I shall only mention particularly one or two remedies. Strychnia I have come to regard as a truly valuable cerebral toner, its action on the encephalic being not far inferior to that which it exerts on the spinal centres. It is a perfectly safe remedy with due care, and although I have employed it for years very largely I have never seen more than slight inconvenience produced by it, when it disagreed with some patients of unusual susceptibility. It should always be given in solution, and combines very well with quinine and iron. Phosphoretted oil I have used occasionally, but it is apt to cause considerable gastric disorder, and I have had but little encouragement to persevere with it. Dr. Radcliffe has recently spoken highly of the hypophosphites as remedies for states of nervous depression. My own experience of them in phthisis would not lead me to expect much benefit from them, and in cases of nerve disorder they have always disappointed me. Cod-liver oil is, I think, a remedy of real value, whether it act according to the chemical view of ministering to the nutrition of the nervous tissue or not. An excellent and rather elegant tonic is a combination of ammon. carb. gr. iv + ferri ammon. citrat. gr. vij—x + tr. nucis vomic. ♏ x—xv + tr. calumbæ ♏ xx + aq. ℥j *ter die.*

CHAPTER VIII.

SPINAL PARESIS.

By the above term I wish to imply a more or less paralysed condition, not of the cord alone, but also of its upward prolongations and developments into the basal ganglia of the cerebrum. The nature of this state in general and its efficient causes have been sufficiently described in the previous chapter; it only remains to illustrate its phenomena when it affects a different locality. This I shall endeavour to do by the relation of some cases, which appear to me of considerable interest.

Case 1.—C. M—, æt. 39, butler, admitted August 17th, having been ill five weeks. He states that his illness came on gradually, apparently from excess in drinking, not in venery. He is paralysed to a considerable extent in both hands, so that he cannot dress himself nor pick up anything. His feet are also weak and flap down in walking. There is a great if not complete loss of sensibility in the paralysed limbs. The paralysis is getting worse. He feels very weak all over. Head hottish, but there is not much pain in it; he has never lost consciousness. Tongue coated at back. Bowels costive. Pulse large, soft. Urine of sp. gr. 1014, of good full colour, not albuminous. Blisters to the neck have been of no service. He was treated with quinine gr. v *ter die* till September 3rd, subsequently with ferri et quin. citr. gr. x + tr. nucis vom. ♏ x *ter die*. He improved gradually, and was nearly quite recovered by December 20th. I have seen him lately, and find he has had no return of paralysis during the six and a half years that have elapsed since he was under my care. In some cases it appears as if alcoholic stimuli taken in excess acted on the spinal centres much in the same way as they do on the cerebral, impairing and depressing their functional power. This is said to be notably the case at St. Nazaire. Last year I attended a female, who had been extremely addicted to brandy-drinking for years; as far as I heard her history, she had never had delirium tremens, but she lost both motor and sensory power to a great extent in both upper and lower limbs for some months before her death. In her it is possible that the alcohol had caused sclerosis of the cord, as no remedies were of any avail.

Case 2.—N. D—, æt. 20, male, admitted September 10th, 1858. Ill one month with inflamed sore-throat, which has got well; but since then he has begun to lose the use of his limbs, the legs being the weakest. He can now stand, but not walk; the legs are very numb and cold, but he is conscious when they are touched. He has no pain at all, nor tenderness of the spine. Sphincters act. Intellect clear. No reflex actions are excited on tickling the feet. Pupils large and almost motionless. Skin cool. Pulse natural. Tongue white. No cough. Heart-sounds natural. Residence damp. Never had syphilis. As I could find no clear indication of organic disease of the nervous centres, I prescribed strychniæ gr. $\frac{1}{20}$, quin. disulph. gr. ij, acid. s. dil. ♏viij, aq. ℥j, *ter die*, with ordinary diet and porter. 14th.—Feels much better; has more use of his hands and legs, and can walk a little. 17th.—Worse last two days. Has now sore-throat and much diarrhœa, with copious perspirations and loss of appetite, "Has no use of the hands or legs again." P. c. mist. et tr. opii ♏viij ad ℥j. 18th.—Tongue very coated, yellowish. Pulse 120 full and weak. Some diarrhœa continues. Nausea and headache. Skin hot and moist. Cannot raise or turn himself in bed. P. c. mist. *quater die.* Vini rubri ℥vj *in die.* 20th.—Bad cough. Pulse 96, full, occasionally intermittent. Bowels quiet. Adde quinæ gr. ij sing. dosis mist. 21st.—No sleep from cough; sputa watery and of a rusty colour. 22nd.—Feels much better, appetite improving. Bowels quiet. Tongue cleaner. No use of limbs. 25th.—Galvanism was applied yesterday with great benefit; he is able to move his hands and arms much better. Appetite very good. Sleeps well. October 4th.—The legs are now much more numb and weak than the thighs. A much stronger current required to excite the leg muscles than those of the thigh; the calf muscles are greatly wasted. The feet used to be very cold and numb, but are not now. The hands feel weak and are rather numb, he has "pins and needles" sensation in them at times. Strychniæ gr. $\frac{1}{16}$, tr. ferri muriat. ♏xv, acid. hydrochl. ♏ij, aq. ℥j, *ter die.* 8th.—Can now walk and feed himself; he cannot bear so strong a current as before. The same treatment was continued till the end of November, when he was discharged with only a slight degree of weakness remaining in the legs, which was referred to the knees. It seemed that the extensor muscles of the thigh had not regained their full power; he was able, however, to walk very well, and his arms had become quite strong. The dose of strychnia was gradually increased to gr. $\frac{1}{9}$ *ter die.*

A curious circumstance observed by himself was that his feet swelled during the night, so that he could not get his boots on in the morning, but after walking about the ward a little the swelling subsided. His urine was free from albumen and was otherwise healthy, except that at one time during the catarrhal affection it deposited much uric acid. I cannot but regard this as a very proving case. A man is admitted with incomplete paralysis consecutive (as he reports) to catarrh; after improvement has commenced he relapses, and becomes considerably more paralytic than at first, while simultaneously he is affected with asthenic bronchial and gastro-intestinal catarrh. Under a persistent tonic treatment he makes a good recovery. It seems impossible not to recognise in such a case as this the operation of a depressing miasm (influenza), acting with unusual potency on the whole nervous system. There is no indication of the paralysis being other than primary and direct, or that it is in any way attributable to remote irritation. The phenomena of vaso-motor paralysis were well marked in the skin and the mucous membranes, and the nocturnal swelling of the feet was owing I believe to the same condition. Is it conceivable that the vessels of the nervous centres were in a state of spasm, and that the paralysis depended on anæmia? What would have been the result of treating this case in the same way as the one recorded by Ollivier, *vide* p. 100?

It is a matter of serious consideration whether excessive (even relatively) fatigue may not in some instances induce, or at least greatly promote, the occurrence of paralysis. The case has been related to me of a young lady who, while in a rather ailing condition, was taken out by her father for a long walk, and accomplished seven miles out and as many in returning home. From that day she was never able to walk above 100 yards, and died some time after paraplegic. It was found, however, subsequently, that she was addicted to masturbation. The following case, which occurred in my own experience, may have been of the same kind, though the inquiries which I made decidedly tended to negative the existence of this baneful practice.

Case 3.—Miss —, æt. 20, had been ill when I saw her about seven months. During the preceding autumn she had been staying at the seaside, and bathed, and took very long walks. She was attacked while bathing with faintness, and was unable after that to walk as before. The last six weeks she had got much worse, though she had been staying in a healthy country situation. Her symptoms were breathlessness on any slight exertion (even on talking), frontal headache, anorexia, slight cough, and mucous expectoration, some amount of menorrhagia, occasional faintness, and profuse perspirations. Pulse 68 while lying down, not very weak; urine tolerably normal, of rather high sp. gr., depositing lithates or lithic acid; no marked anæmia; tenderness of the spine; complains of great weakness of legs, mostly of the left; sensation not impaired. When she tries to walk she does so in a most halting, tottering way, somewhat like a choreic. The muscles of the legs were not wasted, they did not by any means readily respond to faradization, but the skin was very sensitive to the current. She was hysterical and excitable, but appeared honest and unexaggerating. In less than two months she was nearly quite restored, could walk quite well. The remedies employed were strychnia, iron, and quinine, and local faradization.

In both the above instances I entertain no doubt that the excessive muscular exertion acted at least as a powerful determining cause of the paralysis, which might have had its predisposing in another source of exhaustion. That in my case hysteria had nothing to do with the paralysis I am satisfied, if by hysteria be meant a want of will and real desire to get well. The faintness, breathlessness, and profuse perspiration, along with the menorrhagia, mark the existence of general debility, while the success of a tonic treatment adds further to the probability that the local paralysis was a part, though an intensified part, of the same general state.

The efficiency of the cause in question, viz., over-exertion, is further affirmed by a case related by Dr. Russell (*Vide* 'Med. Times and Gaz.,' 1867, May 25).

Case 4.—The patient, J. A—, æt. 22, a quarryman, had been engaged in excessive labour ten hours a day lifting large masses of stone and wheeling them in a barrow. He was of very small make, and evidently unfit for such occupation. He had perfect loss of power in both shoulders and in both upper extremities, so that the limbs hung loosely as foreign bodies. In walking he moved his legs with evident clumsiness, and dropped his feet heavily. Micturition and defecation were normal. There was no other sign of any nerve disorders ; his temperature was normal. A faint lead line was seen on the gums, and evidence was obtained of lead in his drinking-water. Three months before admission the patient had lost the use of his right arm for a week, but recovered it ; and on the day preceding that in which he was taken ill he did his ordinary day's work. On the following day he was in the condition in which we found him, but without any other symptoms to explain the suddenness of the attack. All his organs were healthy ; there was no syphilis ; he had always been temperate. Under treatment by potass. iod., steel, strychnia, cod oil, good diet, support to the arms, thorough champooing, and carefully graduated exercise, he quite recovered. It cannot be stated precisely what share the saturnine poisoning had in causing the paralysis, but it seems to me in the highest degree unlikely that it was the sole cause.

Case 5.—A. W—, female, æt. 9, has had paraplegia last three months, it increased rapidly after it commenced, and in fourteen days was as bad as it is now. She cannot stand or walk, but can move her legs as she sits. There is no loss of sensation in the lower limbs; they have wasted considerably. The muscles of the lower limbs are very insensitive to the interrupted current, more particularly the extensors. The spine is much curved, convex backwards and to the right side. When the legs first became weak she had more constant pain in back, but it did not seem to be increased by friction. Beginning from the two lower dorsal vertebræ there is tenderness on pressing the spinous processes all the way down to the sacrum. No sign of any tumour in front of abdomen, or thighs, no trace of any abscess. At times she has constrictive sensations in the abdomen. The legs have been painful and aching lately; they start sometimes. Urine pale, aqueous, sp. gr. 1016, not albuminous, often thick and offensive, is passed in small quantities and with discomfort; it deposits phosphatic crystals, consisting of aciculæ united in stellar groups; bowels very costive, only opened by enemata; motions very dark and hard, when the bowels act has much pain in lower abdomen and all over her. After a dose of aperient medicine the legs have often appeared weaker. Appetite always poor, capricious, aversion for meat. Had constant nausea when her legs began to fail, but this is less now, is most felt in mornings. The last six wecks has complained of constant pain in the forehead and all over the head. Sleeps badly. ℞ Strychn. gr. $\frac{1}{32}$ ferri et quin. citr. gr. v. aq. ℥ss. *ter die.* ℞ Ol. morrh. ʒi. *ter die.* The limbs to be faradized daily. This was continued for a month, to October 30th, without any advantage, indeed she was reported altogether worse. The circulation was very feeble, the legs hypersensitive. ℞ Liq. cinch. flav. ♏ 40, pot. iod. gr. xxxv., ammon. carb. gr. xxv., tr. bellad. ♏ 80, aq. ℥vi. M. ℥ss. *ter die.* Vini aloes ʒss. p. r. n. Empls. bellad 3 × 6, spinæ dolenti. November 24th. The belladonna disordered her vision and did no good; the plaster was worn for a time, but caused discomfort and was left off. The other remedies have been continued, the dose of bark and ammonia being increased, and infus. chirett. substituted for the water. The aloetic wine moved the bowels well for a time, but even ʒ i. doses fail now; it produced no depression like all other purgatives. The faradization has been continued, and the muscles of the leg, as well as of the thigh, are much more lively, acting briskly to the current. She cannot stand, but wriggles herself about pretty actively on her knees. The back appears much straighter than it used to be; she can, at any rate, sit quite upright without showing any deformity. There is still local tenderness in the lumbar spines as tested by pressure, or applying a hot sponge. She has also pain in the front of abdomen, on both sides, and all about it, but it does not make her wince under steady pressure. Feels still very cold. She is much more active mentally, amuses herself one way or other all day long. Pt. To have warm wine at night, and rum and milk in the morning. December 8th. Better; can walk from chair to chair leaning on her hands. Very pale. Is so pleased to be able to get about that there is risk of her over-exerting herself. 23rd. After a relapse for a few days lately of debility and languor, she has again improved so much that she now walks alone quite well, goes all round the room, and even upstairs, though she halts on the right leg. She says she has nothing like so much pain in the back as she used; she bears pressure on the spine much better. Appetite very poor still. Taking tr. cinch. flavæ ʒ i. *ter die* and strychniæ gr. $\frac{1}{20}$ *bis die,* with rennet wine at meals. Bowels are comfortably moved by syrup. rhamni cathart.; one day they acted of themselves, which they have not done for months. January 6th. Can now walk about very well, but is soon tired. The mornings are her worst time; always complains then of being tired and languid. Sleeps and eats better. Bowels open without medicine. February 13th. Has not made any distinct progress since; a fortnight ago had a relapse, which took her off her legs, and was attended with pain in her back and side, and sleeplessness. Has palpitations sometimes severe; pulse good; urine very thick and offensive last week, clear and natural now. Is extremely nervous and sensitive at night; has great difficulty in getting to sleep; is alarmed and trembles at every sound. Has had cold dashing every morning. Bowels in good order. F. + Q., citr. -c̄. tr. nuc. vom. *ter die.* P. c. oleo. To be much in the open air in a vehicle. March 12th. Has not been much out; one day, after being in the open air about twenty minutes, she became almost insensible and could hardly speak. Is now better again, and pretty active on her legs in the house. The strychnia and bark have been resumed. ℞ Steel wine ʒ i. *ter die.* 17th. Has been moved to the country; has a better appetite last two days than she has had for a year, and sleeps beautifully. Walked yesterday three quarters of an hour without fatigue. April 15th. Is looking much better, and is in all respects much improved. Still she has not the free action of her legs that she ought to have; if she trips in walking she feels it in her back. September 1st. Has been again in the country for two or three months, latterly at Margate. She runs about for hours without being fatigued, and is altogether a different being to what she was. Still a little over-fatigue, especially in the *sun,* has a great effect upon her. January, 1868: continues fairly well, though very delicate.

This case contrasts in several points with No. 2, although I believe the pathological condition was almost identical. The cause in the first case was a miasm acting upon an average system. In the second there was none to be traced, except it be admitted that some might have been generated from some broken-up clayey ground near the house where building was in progress. Solitary vice was of course suspected, but I believe there was no ground for the suspicion. The "grundleiden" seems to have been a most feeble state of the nervous centres, especially of the cord, which was constantly lapsing into exhaustion, and which required persevering tonic treatment not only by drugs, but by pure air, and all that could recruit the feeble power. The excessive hyperæsthesia was both a product of the debility, and reacted on it and increased it, *vide* p. 48. In the first case there was little difficulty in forming at once the diagnosis of functional paralysis; in the second I felt considerable doubt for a long time. The chief circumstance that weighed with me in regarding the disorder as functional was the presence of such marked signs of general debility and hyperæsthesia. Had these been absent I should have been much inclined to set down the case as one of organic disease. The local tenderness of the spine, the constrictive sensations, the phosphatic urine, and the paralysis were formidable symptoms, and might well have proceeded from chronic inflammation of the cord with softening. The insusceptibility of the muscles to the interrupted current was rather a favorable circumstance than otherwise, had the reverse been the case it would have made the existence of actual central change much more probable. The progress of the case was by no means plain sailing, the tendency to relapse from imperceptible causes was very marked, and nothing but steady perseverance carried us through. In all such cases it is wise to follow Dr. De Ricci's example,[1] and refuse to undertake the responsibility unless the friends consent to give one fair play.

It appears to me a very important question in regard to such states as the above, whether what was originally functional may not by long continuance pass into actual organic disease. A case related by Dr. Russell ('Med. Times and Gaz.,' May 25th, 1867) makes this very probable. A man æt. 32, was admitted with complete paralysis of sensation and motion in both lower extremities. There was no impairment of nervous power elsewhere; his intellect was clear. He had been much addicted to self-abuse for the last twelve or fourteen years. He gradually and steadily declined and died in four months. At the post-mortem the cord, about one and half inch above the lumbar enlargement, was rather narrowed, and was more pulpy and yielding than elsewhere; the nerve tubes were in an imperfect atrophic state, and large collections of oil drops existed in the walls of the minute vessels. Abundance of large granule cells with free oil globules in all parts of the cord. The granule cells probably were produced by degeneration of the natural nerve cells of the grey matter. I think the conversion of the less serious state into the graver by no means impossible, and I feel assured that no time should ever be lost in adopting effectual treatment for the restoration of functional power. The experience of physicians in cases of what is termed infantile paralysis is strongly to the same effect; my own observation quite confirms the truth of Dr. West's remark as to the importance of early treatment. Though it is very possible that paralytic affections occurring in children, and much resembling one another may originate in different pathological conditions, as Dr. Heine lately asserted, yet I think the absence of signs of inflammation of the cord or brain, or their membranes, the existence of more or less debility and disorder of health, the non-progressive character of the disease, and especially the "juvantia," will not leave us long in doubt whether we have to deal with a paresis or any organic affection.

---

[1] 'Dublin Med. Journ.,' August 1862.

The following cases illustrate the nature and treatment of spinal paresis in children.

Case 6.—J. G—, æt. 3 years, male, admitted February 23rd, having been ill three weeks. He has lost the use of his limbs, can move his feet, but not stand, or walk. The power of the arms is somewhat impaired also. Appetite bad. The palsy came on in the night; the child was quite well on going to bed; in the morning his mother found his legs quite palsied, the arms to a less extent, and the face drawn to one side; this last symptom lasted only a few hours. Steel wine was given for fourteen days without benefit, and afterwards ferri et quin. cit. + tr. nuc. vom. Turpentine liniment was applied to the back and legs. April 4th.—He is able to stand and walk round a table holding by it. The improvement was soon after interrupted by his having got some wrong medicine, and then by an attack of dysenteric diarrhœa, so that on April 22nd, when the tonic was resumed he had lost the power of standing. After this, however, he went on steadily to recovery, and in the beginning of July he had gone to school. The disorder in this case at first was somewhat extensive, involving not only the nerves of the upper extremities, but one of the facial. It soon, however, subsided in the higher parts of the spinal centre and confined itself to the lower. Under tonic treatment it disappeared, after a temporary interruption by some debilitating circumstances. Clearly this is not the history of any organic disease. The tendency of the kind of paralysis we are considering to supervene during the night is quite a feature that belongs to the family of neuroses, *vide* p. 54.

Case 7.—L. S—, æt. 2 years and 8 months, female, admitted, February 11th. Ill three months. Has lost the power of walking all that time, cannot now even stand alone; but can move her legs, which are not wasted nor cold. The paresis came on suddenly one day, she never had a fit. No pain in spine, nor distortion. No injury to the back at any time. Sphincters act. Has nearly all her teeth. Looks healthy. Some vaginal discharge. Strychnia was given till March 3rd; the dose being raised from gr. $\frac{1}{60}$ to gr. $\frac{1}{50}$ *bis die,* and ol. morrh. ℥i *ter die* given also. In a fortnight she was able to toddle round a chair holding by it, in another week she could just walk alone. Citrate of iron and quinine was then substituted for the strychnia, gr. iv. *ter die*, and in fourteen days she could walk across the room and pick up anything from the floor, though her gait was very straddling.

Case 8.—E. C—, æt. 2, male, admitted February 4th. Ill four months, became gradually worse; has lost the power of walking; bends forward in sitting, cannot hold himself up. His legs tremble so that he cannot stand well. Arms all right. Has pain at lower abdomen, bowels loose, motions offensive, is thirsty, appetite bad, has lost flesh. Sleeps well. Has all his teeth but the last molars. Head distorted since birth, right forehead bulging, left eyelid droops. Never had fits. He was ordered ferri, et quin. citrat. gr. iij. *ter die*, a grain of Grey and of Dover's powder *o. n.* for three nights, and subsequently a little tr. opii. was added to the mixture. Ol. morrh. was given besides. March 21st.—The report is that he is getting on nicely, is a great deal better, runs about. April 4th.—Improvement continues.

Case 9.—W. W—, æt. 2½, male, admitted February 8th. Ill 1½ year, unable to move the right arm and leg properly all that time, no material wasting of arm; halts in walking on the right leg; can walk a little, but often falls. Health now good. Had a fit for 2¼ hours when 1¼ year old when he was cutting two molars, and has had the paralysis ever since. His health was affected at the same time, he was languid and weakly. He was ordered cod oil and iodide of iron, which he continued till March 14th, when citrate of iron and quinine was given in place of the iodide. On 24th the report is that he is doing nicely, gets quite strong on his legs, can use his hand. *Remarks.*—In these four cases the palsy came on without apparent cause in three, in the last it succeeded to a fit. In all I think it may be fairly argued that no material damage had occurred in the centres. That the palsy was not of reflex origin I think certain, both from the absence of any cause of irritation as well as from the "juvantia." Had the vessels of the centres been in a state of anæmiating spasm would not the starved tissue have certainly degenerated and gone into white softening in cases of such long standing as Nos. 7, 8, 9.

Dr. Abbots Smith has recorded (*vide* 'Lancet,' Aug. 17, 1861,) an interesting case of paraplegia in a boy, æt. 10, which was evidently induced by exposure to severe cold and wet. There was complete loss of motion and sensation in the lower limb, incontinence of urine, and also, to some extent, of fæces. The first symptoms were violent shivering, soon succeeded by convulsions, and, as sensibility returned, by giddiness and vomiting. After remaining ten days in bed the paralysis was evident. Some tenderness, elicited by firm pressure at the upper part of the lumbar region, was removed by two blisters, and with tr. ferri. muriat. ♏v *4tis hor.*, to which tr. lyttæ ♏v was added for about a week, and frictions with a stimulating liniment; he made a complete recovery in about three months. Dr. A. Smith remarks that in similar cases he has not found strychnia at all beneficial. I think we need not discuss the question whether the paralysis was dependent on any inflammatory affection of the cord or its membranes, the negative is sufficiently affirmed by the success of the treatment. Convulsions are not very unfrequently succeeded by hemiplegia, and in this instance I think the shock produced by them specially affected the lower region of the cord on account of its resisting power being depressed, partly by the fatigue of a long walk in the snow, and partly by the injurious influence of prolonged cold operating on the nerves of the feet which have their tertiary centre in this part.

In the case of a child who became paraplegic to a great extent after a mild febrile attack, the surface was highly hyperæsthetic.

Dr. Hammond, of New York, relates three cases of paralysis in children which he does not consider to belong to the group we are considering of functional paresis, but to depend rather on fatty atrophy of the muscles. He does not, however, base this view on much more than conjecture, so that I venture to claim them as examples of our present subject of study. In the first case the paralysis supervened during hooping-cough, in the second succeeded a fever, in the third ensued upon an attack of measles, attended with great pain in the back. The remedy which proved successful in these instances (which before its employment were almost hopeless) was the continuous galvanic current applied with frequent intermissions. This is, of course, a very different thing from the same current without intermissions, which, as applied by a Pulvermacher's chain, I am much inclined to consider the best means of improving nutrition, and restoring contractility in states where the paralysed muscles are much wasted, and do not respond at all to the induced current.

When one limb only is affected it may not be always easy to form an opinion whether the disorder is seated in the cord, or in the nerves of the part, especially if one or two nerves only are involved. In proportion to the extent of the paralysis is the probability that the disease is central.

The following case affords an instance of some uncertainty in the diagnosis of the exact seat of morbid action:

CASE 10.—M—, æt. 56, male, seen April 2nd, 1861, having been ill fourteen days since exposure to cold. He had a catarrhal affection when the paralysis came on. He suffers with wearying, aching, dragging pain about the right shoulder, with loss of power in its abductor muscles. The arm hangs closely by the side of the body, and cannot be raised or abducted except by a jerk of the body. The deltoid and trapezius and other muscles about the shoulder are not wasted, but are more excitable and sensitive to the interrupted current than those of the opposite side; a moderate current causes much pain in these parts, and well-marked contractions of the deltoid especially. Two years ago he had similar enfeeblement of the right shoulder, but not nearly to the same extent as at present; it lasted nine months. This morning he could not feed himself with a spoon, nor tie his cravat, nor put on his coat. His vision fails at times, and he has had other signs of disordered nerve-action, as tremblings, twitchings, &c. He is very weak and thin. Skin warm. Pulse good. Urine used to be very thick, last three weeks it has been clear, and of a good colour. ℞ Ammonio-citrate of iron, carbonate of ammonia, tinct. of nux vomica, and infusion of calumba thrice daily; the shoulder to be rubbed daily with compound camphor liniment, and to be faradized. April 8th.—General state improved, that of shoulder not much. A spot about the size of a shilling near the acromion is extremely sensitive to the current. ℞ Strychniæ gr. $\frac{1}{16}$ + tr. cinchon. ʒj. *ter die.* 17th.—Is decidedly improved, can abduct the arm to some extent. May 13th.—Is quite recovered, and has full use of the arm. At times he has felt sensations in his legs of weakness and semi-paralysis. *Remarks.*—Had there not been some indications of failing nerve-power in other parts besides that principally affected, as in the nerves of the eyes and lower limbs, I should have felt much uncertainty as to whether the circumflex nerve alone was affected in some part of its course, or whether the disorder was central. The latter opinion I have no doubt is correct.

Dr. Banks records a case of paralysis of the right hand and forearm of some months' duration occurring in an inveterate smoker, and cured by strychnine internally, and endermically, with, perhaps, abandonment of smoking ('Lancet,' 1864, Sept. 3rd.). This case may serve to direct our attention to a cause of nerve-paresis, which is surely not infrequent.

The following histories will be read with special interest as containing records of post-mortem examination in two cases. Dr. P. Lévi relates ('Arch. Génér. de Médecine,' Feb. 1865) a fatal case of paralysis, commencing in the lower and extending to the upper limbs, attended with diplopia, dysphagia, and constipation, with ammoniacal urine, and terminating fatally by asphyxia on the twelfth day of the disease, the diaphragm having become involved in the paralysis. A very careful autopsy discovered no organic lesion in any part; the cord was quite healthy, and was rather anæmiated than congested. Microscopic examination showed that the tissue of the cord was perfectly sound, and that the nerve-roots, the intervertebral ganglia, and those of the sympathetic, as well as the pneumogastric nerves, were exempt from all morbid alteration. The pia mater of the hemispheres was in a very marked state of venous congestion, and the grey matter of a deep red, but as the author remarks, the absence of all intellectual disturbance during life, and the mode of death by asphyxia, make it certain that this hyperæmia was not the cause of the symptoms. The patient was a healthy man, æt. 22, free from syphilitic taint, and not addicted to alcoholic or sexual excesses. The disorder set in without any appreciable cause, with weariness and heaviness of the head, and a degree of stupor most marked in the evening. He had no pain in the spine, no constrictive sensation of the trunk. The treatment adopted in the Lariboisière Hospital consisted of purgation by croton oil, twenty C. C. to the spine, and calomel in alterative doses. It is clear that this was not suggested by the conception of a primary paresis being the essence of the malady, or else a very different medication, and possibly a more successful, would have been resorted to. The same writer quotes from the 'Gaz. Méd. de Paris,' 1832, an account of the fatal illness and autopsy of the great Cuvier, from which it appears highly probable that the malady was of the same nature as in the case just cited. It is, however, noteworthy that extreme dysphagia was the first symptom, and that the upper extremities were paralysed before the lower. The brain was unaffected. Death occurred in less than a week from the commencement of the disease. All the organs were found perfectly normal. The treatment consisted in leeches to the arms, V. S., emetics, and blisters.

The nature of paresis, cerebral or spinal, is, I think, somewhat elucidated by reflecting on the condition of a nerve, such as the median or ulnar when affected with severe neuralgia. The function of the nerve is temporarily abolished, the skin which it supplies is utterly anæsthetic and the muscles palsied. Under the influence of quinine, and perhaps galvanism, the sensory and motor power is restored. It is certain that these remedies would not amend a state of neuritis; and I can see no other view to adopt than that owing probably to some minute molecular derangement of their tissue depending on impaired nutrition the nerve-fibres are no longer capable of conveying centrad and peripherad the impressions they normally transmit. There is no difficulty in considering that the white fibres of the brain and cord may fall into a like state as those of the nerves, in which case the result would be the same as in peripheral neuralgia. The cells of the grey matter may probably be affected in the same way as the tubules, whose axis cylinders are continuous with their interior. This I am inclined to think is especially the case when the paralysis appears to be the result of a morbid impression (as cold and wet) made on the sensory surface of the skin. The following is an instance of this kind:

Case 11.—J. G—, æt. 45, admitted February 11th, ill two days. Has usually good health, does not admit drinking habits, but there is some doubt about this. Is much exposed to wet in following sportsmen. He got very wet before the present attack, which came on suddenly; he was unconscious at first for a few minutes. He is now very giddy and so weak on his legs that he can hardly stand alone, and was brought to the hospital in a cab. Head rather hot, not painful, aching pains in neck and shoulders. Right hand is closed, he cannot extend the fingers, it feels numb. Tongue clean. Pulse soft. No strength, no appetite, no sleep at night. Bark and ammonia with valerian were given, and after ten days, two grains of opium *o. n.* March 7th.—Able to walk to hospital, right hand numb and crampy. 28th.—Arm galvanized three times without benefit. April 4th.—Quinine and iron ordered. 18th.—He improves, but states that his arm has been better every other day for the last week. May 28th.—He can now carry a large basin and jug filled with water. July 4th.—Getting on well.

I have recorded another case (*vide* 'Brit. Med. Journ.' April 16, 1859), in which symptoms of paralysis with impairment and disorder of sensation appeared in a young man the other day after he had been standing a long time in the wet grass. The paralysis without being complete was remarkably extensive and diffuse, affecting not only the arms and legs, but the masticatory and ocular muscles. Death occurred in about a week from asthenia. Nothing was found in the autopsy in the brain or cord that accounted for the phenomena, nor did microscopic examination discover any exudation cells, any granular coating of the minute vessels, or any indication of structural change. In cases of this kind it seems that the nerve-cells of the cord, as the first recipients of the morbid impressions, have their nutrition in some way disordered, in consequence of which their functional power fails.

Graves, in his lecture on paraplegia, records cases where the disease was induced apparently by exposure to cold and wet, and in which it came on gradually, though with very varying rapidity in different instances; some being rendered almost completely paraplegic in a few weeks, others not for months or years. He finds stimulating liniments, and blisters applied to the parts of the affected limbs most copiously supplied with nerves the most effectual means, conjoined with the administration of strychnia and sulphur internally. He records one case in which a very careful autopsy discovered no diseased condition of any organ.

The conditions above noticed embrace the most frequently occurring forms of paralysis of the cord not dependent upon organic disease. Reflex paralysis appears to me to be a much rarer affection; I have not met myself with an instance of it.

The following, however, recorded in the 'Med. Press and Circular,' 1868, December 9, seems to be a good example:

Case 12.—M. B—, æt. 38, admitted July 10th, 1868, under Mr. Morgan's care in Mercer's Hospital, having been sent up from the country as an aggravated case of paraplegia. He related that about eight months previously he suffered from pains in the lower limbs, which became completely paralysed, alternating with spasmodic contractions at intervals. An extensive slough formed over the sacrum, the legs were œdematous; and he suffered much from pain and prostration. The urine was constantly flowing away, and there was excessive irritation about the bladder. This condition had existed for six or seven months without mitigation. On admission he was suffering greatly from spasms and pain in the lower limbs, which were wasted and œdematous, but retained perfect sensibility. The urine was constantly dribbling away; it was alkaline, containing a large quantity of pus and phosphates. On a catheter being introduced into the bladder violent contractions of the limbs took place, and the rectum emptied itself at once. Mr. Morgan regarding the paralysis as reflex, and depending on the irritation caused by the calculus, determined on its removal by lithotrity, which was successfully accomplished. The first crushing took place on July 23rd. On August 3rd the paralytic symptoms had visibly improved, the pain in micturition abated, and considerably more power of retaining urine had been gained. By August 20th the fragments of the stone were quite removed. In the third week of September the patient was able to stand a little, and gradually improved in walking and power over the limbs, which increased fully one-fifth in size. He was able to go home to Athlone by himself, and to walk steadily with the help only of a stick. Mr. Morgan remarks that it was very interesting, as proving the high degree of reflex irritation, that on passing a catheter along the urethra there were no spasms until it entered the bladder, but then the slightest touch to the interior excited them in a violent degree. That reflex spasm and reflex paralysis should co-exist, is only another instance of the well-known frequent association of these two disorders. In a communication kindly made to me by Mr. Morgan, he states that the paralysis of the lower limbs was unequivocal, the legs were incapable of motion, he could not raise them or bend the knee, the upper extremities were quite unaffected. The paralysis commenced shortly after the manifestation of the first urinary symptoms.

As there appears some tendency to use the term rather loosely I will repeat that it seems to me properly to belong only to cases where the paralysis is evidently dependent on a persistent irritation, increasing when this is increased, and *vice versâ.* It is characteristic of *true* reflex paralysis that removal of the irritation proves curative, while all other means fail. It is certain that no true case of reflex paralysis would be benefited by strychnia, or galvanic excitation of the nerves or muscles of the affected part, nor by stimulating applications to the cutaneous surface. These are appropriate to the paretic state and form by their success a good test of its presence.

There is another group of instances, which are not very uncommon, but the pathology of which is very obscure, and which I allude to without by any means affirming that they truly belong to the class of pareses. The following is an example:

CASE 13.—E. S—, female, æt. 7½, seen August 12, 1861. A month ago became feverish, her head, or rather her neck, was stiff. She has been treated for rheumatic fever, but does not seem to have inflamed joints; the urine has deposited a thick whity sediment. Her legs became weak at once, after two days she had quite lost the use of them; the left arm was affected similarly a little before the legs and remains so. She was delirious at first and had pain at the top and back of head, which has ceased. For fourteen days she could not sleep at night for restlessness, sleeps now. There is no loss of sensation in the legs, but rather pain; she cries out when her calves are touched. No tenderness in spine. The muscles of all the paralysed parts are very insusceptible to the interrupted current. She is quite unable to stand. Functions in tolerable order. I prescribed strychniæ gr. $\frac{1}{41}$ + ferri et quin. citr. gr. vi. + aq. ʒss, *ter die;* the dose of strychnia was afterwards increased to gr. $\frac{1}{30}$, and the limbs were occasionally faradized. October 5th.—Is decidedly improved, can stand. The right leg is far the worst, and its muscles insensible to the current, but the skin is hyperæsthetic, more so than it used to be. The left arm remains very useless, she has no power or but little over the flexors. Some stiffness in the muscles of the jaws from the strychnia. March 28th, 1862.—Is decidedly improved, moves about actively, but the left hand and arm are still deformed, the hand drawn back on the forearm; she can, however, hold things with it. December 31st, 1862.—Walks about well, has walked some miles in a day, but halts still on the right leg. The flexors of the left hand are deficient in power, though she can use the hand tolerably. No medicine taken the last year.

The first question here for consideration is whether the disease was essentially acute rheumatism attacking the cord. I am quite aware that rheumatism may appear primarily in the heart, but I doubt whether it is ever confined to this or any other internal organ, without sooner or later manifesting articular symptoms. There must evidently have been some resemblance to acute rheumatism in the febrile attack to have induced the attending practitioner to make this diagnosis. It is not easy to regard the disease simply as myelitis. The delirium, the very early supervention of paralysis affecting the cord as high as the origin of the brachial nerves, the preservation of sensibility, and the "juvantia," seem to me to afford evidence against viewing the disorder as a simple inflammatory action.

It is a highly important point to which Dr. Gull has drawn attention that lesions of the cord are occasionally attended with an affection, which in many respects is closely similar to acute rheumatism. The explanation of this probably is that the vaso-motor nerves of the whole system are paralysed, and that in consequence pyrexia is set up. Case 27, recorded by this physician,[1] is of very high interest. The patient a widow working hard at a mangle had for two years, when exerting herself much, felt pain in the back between the shoulders, and a sense of constriction and coldness round the chest. Ten days before admission she was seized with pain in the left leg, and spasmodic contraction of the muscles, with increase of the pain and constriction of the chest. She could extend the leg, but not walk. The next day there was febrile heat and diarrhœa, the hands, knees, and ankles were swollen and painful. A slough formed on the sacrum. On admission the hands were swollen, stiff, and painful, with some erythema. The legs were so far paralysed that she could only move them very feebly and slowly; the muscles very wasted, but retained their electro-contractility. Sphincters weak. Sensation nearly normal, but at times both legs felt numb, and were drawn up involuntarily. Touching the feet gave rise to formication and to very lively excito-motor movements. Eight days after admission the hands were still swollen and erythematous, the face flushed. Pulse 100, full. Perspiration had an acid smell. Pupils large. Nights sleepless. Urine ammoniacal. Opii gr. i, *6tis horis.* Wine six ounces daily and a chop. Under this treatment, with faradization of the limbs, she completely recovered in about six months. This case seems to me to have been essentially one of paresis of the cord with implication of the vasomotor fibrils. The history is wholly that of nervous exhaustion, the symptoms are not contradictory (no pain or tenderness on pressure of the spine), and the "juvantia" are entirely corroborative of this view. The state of the urine and the good effect of the opium afford some tolerable evidence that the disease was *au fond* different from acute rheumatism. The occurrence of a slough on the sacrum in the existing condition of the vascular system is pretty good evidence that the local death was not dependent on arterial constriction and anæmia, as Brown-Séquard supposes it to be. It is much more probable that the impairment of nervous influence left the integument so enfeebled in its vital qualities that it was unable to resist the injurious influence of pressure. On careful consideration it appears to me highly probable that the case I have above recorded was essentially similar to Dr. Gull's, the quasi-rheumatic disorder in each being pronounced in the same way. In my case, however, the cause of the affection was probably some obscure influenzal or miasma acting on a weakly nervous system. The child resided in one of the outskirts of London, where house-building was in progress, a kind of locality which I have often observed to be favorable to the generation of such influences. The long persistence of the paralysis suggests its dependence on some organic lesion, but this is opposed by the decidedly good effect of tonic treatment, though it was by no means effectually carried out.

---

[1] 'Guy's Hospital Reports,' 1853, p. 197.

The following history seems to me of great interest, though it must be admitted that it is not so easy to give a satisfactory explanation of it. It is, however, surely of much importance to be aware that paralyses of this kind may occur, which certainly do not depend on degeneration, inflammation, reflex irritation, or any discoverable toxic influence.

Case 14.—Sc—, æt. 37, rather slight and delicate looking, a hairdresser, was seen November 8th, 1865. He began to ail with headache and uneasiness of his limbs about nineteen days ago; took to his bed five days later. On further questioning he admitted that he had some headache and slight giddiness about eight weeks before any paralysis commenced; he was never quite well afterwards. He had not been exposed to wet, but to chills while perspiring. He had got worse since he laid up. His legs were first affected, the first symptom was that they got weak, so that he fell in attempting to walk. He was also giddy. At present both hands feel numbed, and are the seat of "pins and needles sensation" as high up as the elbow. The grasping power of the hand is rather impaired; with some difficulty he can raise a piece of bread to his lips, but not a cup of liquid. Both hands are equally affected. He cannot stand on his feet, nor sit on a chair, nor bend his knees; the extensor muscles immediately restore his limbs to the straight position if the knees are bent. Both feet are numb, and the anæsthesia extends up to the top of the thighs. He complained of cutting pain across his insteps. The temperature of his feet in bed seems normal, some days previously they were very cold. He did not feel when I moved his feet at the ankle-joints, nor had he pain on passive movement of any of his articulations. The morning of admission the pains in his limbs were so severe that he became quite excited and delirious, "grinned his teeth viciously, struggled with his arms, felt himself going mad." The bladder acts normally. The bowels were confined. Head pretty free, he had no pain to speak of at any time in it. Vision and hearing intact. He could not turn in bed, but he had no pain in the back; when he leant forward he had pain in the abdomen. He had no heat or tenderness of head, nor any in the spine when full pressure was made. The heart sounds were normal. He was not subject to rheumatism. He had never passed worms. The urine was rather scanty, it had been very thick with lithates, but was not so now, but high coloured. Pupils were rather small. He admitted having had sores on the penis twelve or thirteen years ago, but no constitutional symptoms had ever occurred. On the very reasonable view that these symptoms, whose causation was so obscure, might be dependent on a latent syphilitic taint, the effect of mercury was tried, and Plummer's pill was administered until the gums were made a little sore. No decided benefit was produced, and the patient was admitted into St. Mary's Hospital under my care November 16th. The notes taken the next day state that he had not the severe pains he used to feel in his hands and feet, but the feet and legs felt heavy and dead, and were very sore; the hands felt numb, and the feet too. He could, however, tell which hand or which foot I touched. He had no power of standing, slid down in bed, could not hold himself up, and could not turn in bed. He had emaciated much, and had only been able to eat the last day or two; his appetite was now tolerable. The next day his muscles, both in the arms and legs, were found quite sensitive to the interrupted current. Ordered potass. iod. gr. v, + ammon. carb. gr. iv, + tr. valerianæ ʒj, + inf. valerianæ ℥j, *ter die*, and a few days later olei morrh. ʒj, *ter die*. November 24th.—The hands and feet, the latter of which two days before were very sore and tender, were more numb to-day. No reflex movements were excited by tickling. When he attempted to stand he did not know whether his feet were on the floor, but he could hold anything well without the aid of sight. The mixture was continued with pot. iod. gr. vij, and three days later tr. cinchon. ʒj was added to each dose. November 29th.—He was able to cut up his food, his hands felt numb at times, at others quite well. December 1st.—The pot. iod. was discontinued; on December 6th he could dress and undress himself, and could stand a little. Brandy two ounces. On December 12th he could walk the length of a long ward, complained most of weakness about the ankles and knees, and of being very nervous. His legs were emaciated. December 19th.—He could go up and down stairs, and shave himself. December 30th.—He had been out-patient a week, and stated that he felt some return of numbness and tingling in the feet yesterday. Ammonio-citrate of iron, with carbonate of ammonia, tincture of nux vomica, and tincture of calumba, were ordered, and a week later (when he could walk two miles a day) quinæ disulph. gr. v, *ter die*. On March 8th he appeared quite well. The view which I take of the pathology of this case is, that the motor nerves, and their tertiary centres in the cord, were affected in the same way as a sensory nerve is in common neuralgia. The sensory nerves were also affected, but not to the same extent; the motor paralysis was greater than the sensory. What was the precise nature of the alteration must be uncertain, probably the nutrition of the axis cylinders was in some way impaired. It is a matter of certainty, I think, that no myelitis, or meningitis, or any coarse lesion existed, for such disease when grave enough to produce the amount of paralysis which this patient had, rarely, if ever, departs without leaving traces of permanent damage, and especially requires much more time for recovery than was needed here. Reflex paralysis must be excluded, for the sufficient reason that no remote irritation was ever discovered or removed.

Diphtherial paralysis is very evidently a paresis. From its proneness to extend so widely over the nervous system, affecting not only nerves of motion, but those of common and even special sensation, it seems most probably to be a central affection. This is also inferable from its being generally, if not invariably bilateral. It is stated by Dr. H. Greenhow that diphtheric paralysis at its outset is peripheral, extending gradually upwards from the tips of the fingers and toes towards the trunk. This certainly is the usual description of what is termed peripheral paralysis (as distinct from a central affection), but it is obvious that it by no means implies that the extremities of the nerves are first affected, and that the morbid action gradually advances central to the cord. It really means that one set of nerves is affected after another, leaving it entirely an open question whether the nerve-roots are the seat of the disorder or the distal extremities. It is clear that the same phenomena would ensue if we suppose the morbid action to be located in the cord and to proceed gradually upwards from below. The view of the paretic nature of diphtherial paralysis is strengthened by the occurrence of similar paralysis after typhus in which, as Leudet[1] affirms, there is an absence of any morbid change in the brain or spinal cord. As far as I can find it does not appear that any organic change has been discovered in the nervous centres in fatal cases of diphtheric paralysis. The only exception is a case recorded by Mr. Humphry,[2] who found a small suppurated spot with softening of the adjacent brain substance in the superficial part of the left cerebral hemisphere. Hemiplegia of the right side had been present, but had gradually disappeared. The connexion of this lesion with the paralysis seems open to some question.

The interval which most observers have found to occur between the cessation of the primary disorder and the supervention of paralysis is an important point for observation, as remarked by Dr. Greenhow, since it tends to show that the nerve affection is not attributable either to albuminuria or to anæmia. It seems also as if it could hardly be the result of the original poison or influence, as no indications of it appear while the action of the latter is in its full intensity. In this respect it resembles the renal sequelæ of scarlatina, which sometimes ensue at a period when convalescence has decidedly commenced. That it does not depend on the local mischief produced in the throat, and therefore is not of reflex character, may certainly be concluded from its late supervention, in most cases when the primary lesions have nearly or quite disappeared, and also from the circumstance that the palsy has sometimes occurred without any, or with only the most trifling, throat affection. As numerous cases of even severe diphtheria recover without any paralysis, it follows either that some special modification of the original poison must be generated in the system; or, what is more probable, that a certain peculiar state of the nerve-centres is requisite to allow them to be rendered paretic by the poison. This state may be gradually induced during the progress of the disease. The opinion expressed by Gull with regard to typhus fever,[1] that elimination of the poison from the system by no means coincides with convalescence, seems to be verified also in the case of diphtheric paralysis. The basis of this view is a due appreciation of the importance of the vital state of the solids with reference to their liability to be affected by poisons. It is by no means necessary that the presence of a poison in the blood should evoke phenomena of disease; the latter may not ensue or may cease because the tissues either are, or have become, inapt to be affected. This is a most material point for the practitioner, who often has no power to prevent the entrance or the stay of a poison in the system, but who may do much to render the system tolerant of it. *Vide* a paper "On the Theory of Elimination in the Treatment of Disease," 'Brit. Med. Journ.,' April 24th, and May 1st, 1858.

---

[1] 'Gaz. de Paris,' 19, 1861.

[2] 'Brit. Med. Journ,' July 4, 1863.

The treatment of diphtheric paralysis is wholly that of a paretic affection, and may stand for that of spinal paresis. This at least expresses the general opinion of those who have had experience. Wade is the only writer who finds more advantage from pot. iodid., ferri iod., and hyd. bichlor., than from strychnia, quinine, and iron. These, and especially the first, are the remedies to which I should always have resort, together with ol. morrh., a pure air, and a generous diet. The dose of strychnia may possibly require to be increased in some cases rather largely. I should not abandon its use in any refractory case, where the diagnosis of paresis was certain, until I had carried it to the extent of producing slightly its physiological effects. Dr. Bardsley[2] gave it in some cases of paralysis to the enormous amount of a grain and a half daily. Sulphuret of potassium baths have proved useful in this kind of paralysis, as well as in various kindred affections. This affords an instructive example of the beneficial effects of suitable stimulation of the sensory nerves of the general cutaneous surface. Although the effect produced on any one part is small, yet the total impression conveyed to the nervous centres is considerable, and probably by its mildness and general diffusion acts with great advantage. Dr. Copland relates a case of general motor paralysis removed after other means had failed by frequent recourses to warm baths containing stimulant substances. In one case of paraplegia under my care lamp baths and the cold douche to the spine had been of benefit. These remedial actions are just the opposite to the morbific inhibitory, but in both the same principle is involved, viz. that of affecting nervous centres through afferent or excitor nerves; the result in the one case being to depress, in the other to arouse the functional energy. Everything depends on the *kind* of impression made, and on the vital state of the nervous centres. The virtues of pine-leaf mud baths, and of those made with the contents of ruminants' stomachs, are to be accounted for in the same way. The following are well-marked cases of diphtheric paralysis.

---

[1] 'Med. Times and Gaz.,' April 5, 1862.

[2] 'Hospital Facts and Observations.'

CASE 15.—H. W—, male, æt. 11, admitted April 23rd. Ill two months. Has had a severe attack of diphtheria followed by violent sickness, albuminuria, ascites, and lastly the symptoms of paralysis of the soft palate and extremities. Liquids are apt to return through his nose when he tries to swallow. His arms are very weak, but not quite paralysed. The legs are very useless, he cannot stand, and has very little sensation in them. His vision is affected, he cannot see near things well. The paraplegia has come on the last three weeks. The sickness has subsided. Three children and the mother of the family were attacked, and one died. Ordered strychniæ gr. $\frac{1}{30}$, ferri sulph. gr. ij, spt. æth. s. co. ♏x, aq. ℥ss *ter die*, et ol. morrh, ʒi, *ter die*. Lin. terebinth. dorso. The dose of strychnia was gradually raised to gr. $\frac{1}{20}$, and he was almost quite well by the end of June.

CASE 16.—J. S—, æt. 40, gardener, admitted February 28th, 1868. He has always been a weakly man, but continued at his employment until September, 1867, when he had a slight attack of diphtheria. At the same time two of his children were affected and died, and his wife and mother-in-law were also attacked. His wife still has numbness in different parts. Two years ago had a sunstroke in the hay-field, was insensible for some time, he cannot say how long. Ever since his memory has been bad, and he has had pain at the back of the head. On February 21st, during the night, he felt a severe pain at the back of his head, and after that he found he had lost to a great extent the use of his right arm and leg, and had numbness of the left hand. Grasping power of right hand is very feeble, the fingers tingle, and feel as if they were crossed one over the other. The left hand felt as if there was some constriction round the arm which prevented the blood circulating freely through it. Heart and breath sounds normal. Pulse 74. Is not in pain, but tearful and in low spirits. The house where he lived was very badly drained, the rooms were offensive. March 7th.—His speech is evidently impaired, he has been getting worse the last two days. Has lost almost all power over both his lower limbs, cannot flex the knees at all, and can extend them very little better. The muscles of the right limb are rather rigid. Has more use of the right arm, but not the least motor power in the left; its muscles are nearly flaccid. Not anæmic. 8th.—No pain in head; all four limbs are quite paralysed to-day. 12th.—Temperature 104°. Urine highly alkaline and turbid, not albuminous; sp. gr. 1020. Two days later pleuritic pain was felt in the right side, and on the 20th he began to expectorate very offensive muco-purulent matter, indicative of the occurrence of pulmonary gangrene. The paralysis of the limbs had now disappeared. The pulmonary symptoms continued, and he died exhausted April 18th, having had no return of paralysis or other nervous disorder. A large sloughy cavity was found in the lower lobe of right lung.

I entertain little doubt that the paralysis in this case had a relation to the preceding diphtheria. The previous sunstroke no doubt predisposed the nervous system to suffer more severely than it would otherwise have done, but the paralysis can scarcely be attributed to it as its chief cause, seeing that more than two years had elapsed without any such result ensuing. The chief interest of the case seems to me to be in the long interval which elapsed between the occurrence of the slight diphtheria and the invasion of the paralysis. For three or four months the man appeared to be well, yet the influence of the diphtheria was upon him. It is often the same with other diseases. The features of the paralysis, its diffusion, change of seat, and evanescence, leave no doubt that it was not of organic origin.

Mr. J. Bell records ('Edin. Med. Journ.,' 1865, March) a case of paralysis succeeding diphtheria, which presents two points of much interest. Both the upper and lower limbs were so paralysed as to be almost useless. During the month in which the paralysis of the lower limbs was most complete, a very annoying accompaniment was a peculiar heat and redness of the feet and ankles, with slight swelling; it seemed to arise from a fulness of every blood-vessel; was quite different in its appearance to the ordinary œdema of weakness, and doubtless arose from the paralysis not being confined to the ordinary motor and sensory nerves, but attacking also the vaso-motor. It was much mitigated and relieved by the internal use of atropia in tolerably large doses. Strychnia, iron, and other tonics, given internally for the cure of the paralysis, were of no marked advantage. The same may be said of local treatment by means of stimulating liniments. Mere warm baths seemed only to make the weakness of the limbs more felt by their enervating effect. But warm baths persisted in for three or four minutes, as hot as possible, and followed instantaneously by cold douches on the spine and limbs, seemed to have the very best result, both at the time and permanently. Such baths repeated every other night had a very marked effect in aiding recovery. The morning cold bath, with prolonged cold douche on the limbs, though both cleanly and pleasant, could not be said to have any marked effect for good or evil.

The following case, though long, is worthy of perusal, as exhibiting a remarkable example of the manifold and varying disorders which are liable to ensue when a cause capable of deranging nervous power has taken hold of the system :

Case 17.—A man, æt. 31, who had previously had good health, came under treatment for a deep diphtheritic ulcer of the right tonsil, which caused pain in swallowing, troublesome accumulation of mucus in the throat, and was accompanied with cardialgia, and suddenly occurring paroxysms of suffocation, coming on especially at night. Three weeks after the diphtheritic affection commenced, he had a fall from giddiness, and during the next eight days became very feeble, and impairment of memory, heaviness of the legs, and a dragging, staggering gait came on. He walked quickly better than slowly, and worst in the dusk, as he required to see his feet in order to direct the movements of them. Then sight began to get dim, and after fourteen days everything appeared as if shrouded in a thick mist; but there was neither strabismus nor double vision, nor any drooping of the eyelids; the pupils were normal, and the iris freely mobile. Deglutition ceased to be painful, but became difficult, food returning by the nose. The soft palate hung loose, and flapped on deep inspiration. The ulcer in the still swollen tonsil was deep but clean. Some days later taste was lost for all but sweet things, a solution of quinine not tasting at all bitter. Peculiar pricking and shooting pains affected the middle of the hard palate and the right corner of the mouth. The nape of the neck was sensitive, and the head could not be held up straight, the muscles of the nape having lost power. The giddiness increased, and he became very drowsy. Later the pricking pains affected the ulnar border of the right hand, and the tips of the fourth and fifth fingers, and the sensibility of those parts was diminished. The voice became highly nasal. He could no longer see his feet, and his gait became exceedingly uncertain and staggering. There was obstinate constipation, and though laxatives were taken daily, the bowels were relieved only once in four or even six days. On September 22nd, sight returned quite suddenly after having been lost for a month. Some days later the memory was restored, and the giddiness, the drowsiness, and the pricking pains in the gums and corner of the mouth all ceased. But as the cerebral symptoms disappeared, affection of the spinal cord rapidly increased. Pain fixed itself in the upper vertebræ. The sensations of cold, formication, and deadness in the hands and feet changed in fourteen days into complete anæsthesia. Everything felt to the patient as if his hands were covered with woollen gloves. He could not take up small objects, nor hold fast larger things when given to him; he could neither write nor convey food to his mouth, but he could distinguish between heat and cold, and the latter seemed rather to increase the sensibility. In the feet and legs, up to the knees, he felt an icy coldness, and he could only just feel the ground under his feet; he could neither stand nor walk alone, for he felt as if constantly rocking to and fro. Peculiar convulsive movements of the fingers and toes now came on, some being extended, and others flexed or adducted, the movements being altogether beyond his control. He could still taste sweet things, but nothing else. To this was added complete insensibility inside the mouth; difficulty of deglutition continued. If in the dusk he folded his hands together, he could never separate them until light was brought so that he could see the position of the fingers. In the beginning of October the delusive rocking motion ceased, and the patient could no longer, when he put his feet down, feel the ground, he was obliged always to sit or lie; he could not rise up without aid, and when lifted up his legs would not support him; but while lying he could stretch out the legs with tolerable force; he could give a fair squeeze of the hand, and could swing the arms backwards and forwards, but was not able to lift them up. At this time the dysphagia quite disappeared, so that the patient could again satisfy his imperious appetite. The impulse to eat came on suddenly, and if he could not quickly satisfy it he grew faint. The swelling and the ulceration in the tonsil had disappeared, but the voice remained nasal. In the middle of October the icy coldness of the legs ceased, giving place to an agreeable sensation of warmth. In the latter half of the month, however, the paralysis of the lower half of the body reached its highest degree, and the pain in the back was felt lower down towards the loins. For some days the patient could not feel that he sat, and had no sensation in the genitals. The government of the lower extremities was entirely lost, and when the patient was held up on both sides, he dragged his legs after him as if quite inanimate, yet he could, while lying on a sofa with his legs up, stretch them forcibly out. He sat always bowed extremely forwards, and could only raise himself up straight for a moment. Œdema of the feet came on; the urine was clear and frothy, but contained neither sugar nor albumen. In the middle of November the above-described symptoms began to disappear gradually, so that in December all the functions were normal; only some difficulty in writing remained. By the end of the year, however, this had ceased, he was perfectly well and had gained flesh and strength. The treatment was such as is usually employed. The patient took strychnia for a long time, gr, $\frac{1}{20}$, cautiously increased to gr. $\frac{1}{12}$ morning and evening, its use being discontinued for four days every twelve days. ('Schmidt's Jb.,' 1865, vol. 127, p. 164, 'Brit. and For. Med.-Chir. Rev.,' 1866, January, p. 243.)

We may remark in this instance (1) that the disorder confined itself almost entirely to the cerebro-spinal nerves and centres, the sympathetic and the visceral seemed to have escaped. No mention at any rate is made of derangement of the circulation, respiration, the secretory, or calorific function. (2) The morbid change seems to have commenced with the cerebral and superior nerve-centres, and to have afterwards shifted to the inferior. (3) The great majority of the disorders consist of motor, sensory, or intellectual paresis, but the co-existence of spasm is shown in two, viz. the convulsive movements of the fingers and toes, and the icy coldness of the feet and legs, which, of course, implies a state of arterial spasm. (4) The drowsiness, giddiness, and failure of memory show that the nerve-centres themselves were affected, and that the disorder was not merely peripheral. (5) It seems very unlikely that the several motor and sensory palsies were dependent on anæmia of their nerve-centres, and not on direct molecular change in the nerve-cells and fibres. (6) The state of the feet contrasts remarkably with that which prevailed in the preceding instance, vaso-motor spasm in the second replacing vaso-motor in the first.

To the same class as we are now considering belong, I think, those remarkable instances of paralysis cited by M. Gubler in his well-known memoir ('Archiv. Génér. de Méd.,' 1860, 1861). One is a case of general paralysis affecting a child two years old, exhausted by diarrhœa and an attack of measles. A cure was effected by generous diet and tonics. Another is that of a girl, æt. 9, convalescent from scarlatina, when she lost first her hearing, then vision, and afterwards taste and smell. All treatment failed until iron was administered and wine. In three weeks she was quite restored. A case is cited from M. Pidoux in which a discrete variola was succeeded at the period of desiccation by palsy of the velum palati, followed by paraplegia, and afterwards by palsy of the arms, with depression and profound melancholy. With stimulating frictions, bark, coffee, and sulphur baths, he recovered completely. M. Gubler recognises the essential dependence of these paralyses, and of similar ones, on debility or nervous exhaustion, and ranks the paralysis succeeding diphtheria in the same class as only a particular case of a general rule. He thinks, however, that they are quite independent of all (even functional) derangement in the centres and nervous cords, and holds that they are entirely peripheral. This view seems to me much opposed by the extensive prevalence of the paralysis; by the

LEEDS SCHOOL OF MEDICINE

difficulty of conceiving why the delicate structure of the nerve-centres should escape participation in admitted disorder; by the implication of the mental actions in some cases; and by the occurrence of similar paralysis after epileptic seizures. It is also to be remarked that in these and many similar instances the peripheral parts had not been affected by any injurious influence as cold, or wet, or inflammation, which could in any way account for their paralysis.

This seems the most suitable place to advert to the spinal symptoms observed during the several stages of typhoid fever, which have been so well studied by Fritz at Paris. They are very various; and a complete list of them would comprehend almost all those that are known to spinal pathology. The alterations of sensibility are hyperæsthesia of more or less of the whole cutaneous surface, spinal hyperæsthesia, rachialgia, with pains radiating to different parts of the body, insupportable pains in the lower extremities, pains in other parts, cutaneous analgesia and anæsthesia, muscular anæsthesia. Derangement of the motor functions of the cord are not less serious, paraplegia, paralysis of sphincters or of detrusors, partial paralysis of the respiratory muscles, spasmodic contractions of the same or of those of the limbs, &c. Certain special symptoms appear to originate in the medulla oblongata, as extreme dyspnœa, independent of any affection of the voice or of the respiratory muscles, aphonia, alalia, masticatory glosso-plegia, paralysis of the pharynx, besides spasmodic disorders of the pharyngeal, laryngeal, sterno-mastoid and trapezius muscles.

Severe spinal, as well as cerebral affection, is much more prevalent when typhoid fever is epidemic than when it is sporadic.

From the evidence of autopsies, and from clinical analysis, it appears that even in the cases in which the spinal symptoms have attained an unusual violence, it cannot be concluded that the fever is complicated with myelitis or meningitis. Most commonly the spinal cord and its membranes are not the seat of any appreciable material lesion. ('Brit. and For. Med.-Chir. Rev.,' April, 1865.) To Dr. Fritz's recommendations in the matter of treatment we are disposed to demur. Dry cupping or scarifying along the spine, cold lotions, repeated purgatives, we should object to; cutaneous revulsives and stimulating baths might serve the patient better; but we should chiefly confide in means calculated to support and recruit the failing nervous power, in the administration of food and alcohol, and suitable tonics or sedatives. Between spinal symptoms occurring at an advanced stage of typhoid, and the delirium of collapse so well described by Dr. Hermann Weber ('Med.-Chir. Trans.,' vol. xlviii, p. 135), there is, I think, much affinity. The supporting and soothing measures which are so serviceable in the latter would be appropriate (*mutatis mutandis*) in the former. Opium has no mean claims to be reckoned a nervine stimulant; it was beneficial in Dr. Gull's case quoted at p. 142, and I can hardly think with Dr. Fritz that it is contra-indicated in the states he has so ably described.

CHAPTER IX.

CEREBRAL EXCITEMENT.

This state is, speaking generally, the opposite to paresis. Not, however, that this is true without considerable qualification, for many times excitement is more truly allied to paresis than to healthy activity, and the one passes readily into the other. In the state of healthy activity the natural faculties are aroused, intensified, and strung to endurance to a degree that is sometimes marvellous. A mother will watch by her child's sick bed for days and nights together, till nature, one would think, must have sunk exhausted. Here, as in many like instances, love is a most potent energizer. I cannot tell whether its achievements are ever equalled or surpassed by those of its sterner rivals, but I must allow myself to cite one beautiful tale of its efficacy. "After the crossing of the Green river the whole party went on foot, and the men were becoming every day weaker for want of food. The painter, who had one foot badly frozen, became at last, through lameness, constantly the last man on the trail, and once his energy almost deserted him. He was at the top of a mountain of snow, with not a tree to be seen for many miles. Night was approaching; and in the direction taken by his comrades not a sign of life could be descried. He sank exhausted on the snow bank, and took out of his pocket for a farewell look the miniatures of his wife and children. *Power came to him out of their faces.* He thought how little his wife could afford to be a widow, or his children fatherless, beat down his despair, and struggled forward." ('Household Words,' March, 1857, p. 264.) Many a like story might be told, and I venture to think that we have yet hardly appreciated all that such records teach us. Is it not true that just as selfishness, jealousy, fear, corrode and impair the energies of the mind and its material associates, so the nobler passions actually increase and exalt them? The mental stimulus not merely arouses a pre-existing physical power, but positively gives it a force it had not. "A sinful heart makes feeble hand," says one great poet, while the conviction that 'God defends the right' has nerved many an arm to daring deeds. It is not easy to say how far this increase of power might be carried if the highest motives had always their due sway.

The effect of cerebral excitement varies extremely according to the previous condition of the organ. A strong, well-balanced brain will bear a great deal of excitation without showing any irregular or violent reaction, or subsequent debility; while a weak and excitable one will be provoked by a less amount of stimulation to manifest phenomena of morbid activity, and will fall subsequently into great collapse. It is just in the difference of capacity for enduring the wear and tear of excitement that original endowment and training show the greatest influence. One man will sleep soundly and digest well under the same anxiety which renders another wakeful and dyspeptic. It is related that the Iron Duke on the eve of an engagement was aroused during the night from his sleep by a message that some important point was seriously menaced. Having reflected for a moment he pronounced it erroneous, and turned off to sleep again. He was right, but few men could have composed their brain to sleep after such an awaking, even though they were persuaded that the alarm was groundless. In these days of feeble and sensitive nervous systems it seems to be one of the most important parts of education to develope by physical and moral training a robust and non-excitable state of brain, so that the individual may be well able to confront the strain and struggle of actual life. It is in not affording this robust vigour, but generating hyperæsthesia instead, that tender nurture becomes often positive cruelty.

The morbid states characterised by cerebral excitement are chiefly those in which delirium is a conspicuous feature. Quiet muttering delirium tending towards coma may be left out of account. Active delirium, sthenic and asthenic, and the so-called delirium tremens, are the states we propose to examine. Sthenic delirium is a common result of meningitis, and of ardent and of other high fevers. The grey matter in such cases is usually found after death of a darker colour than normal, and sometimes, especially in young persons, is distinctly reddened. The white substance exhibits numerous bloody puncta. There can be no doubt, however, that fierce delirium may occur when there is no remarkable vascular injection, at least when no traces of this are found after death. In fact in this, as in a multitude of similar instances, the excitation of the tissue is the primary change, and the vascular repletion is secondary and varying. It is clear that we have not, and it is probable that we never shall have, an exact knowledge of that pathological condition of nerve-tissue which gives rise to delirium; but though we cannot say in what respect of shape, or molecular constitution, or chemical composition the nerve and nerve-cell of the delirious patient differ from those of the healthy, I by no means admit that we are destitute of real and useable information in respect to the nature of this disorder. Delirium may be taken as a type of *irritation* affecting a certain tissue and locality. This latter term, though sometimes objected to as a vague one, cannot be dispensed with by the clinical observer, and conveys, I venture to think, to the experienced mind information of a tolerably definite kind. The following may be enumerated as the chief features of irritation. The part affected is *unduly impressionable,* is less tolerant of its natural stimuli than in the state of health. *Its functional energy is lowered,* it is less capable of doing its appointed work, but is much more readily set in action. At the same time *its nutritive actions are deranged,* its secretions (if it be a secreting organ) are often altered in quantity and quality; while its vessels, participating in the general enfeeblement, no longer *duly regulate the blood supply,* or restrain their contents from *exuding in excessive quantity.* In fact (reverting to delirium), it is a condition which ranks pathologically between pure hyperæsthesia, or hyperkinesia, on the one hand, and developed inflammation on the other, and approximates in different instances more or less to either.

There is no inconsiderable analogy between a diarrhœal or a salivary flux, and active delirium. In both extensive tracts of cell-growth are stimulated to an excessive and rapid nutrition, which interferes with the due development of the individual particles. In the former instance the cells being disposed on a free surface are shed rapidly; in the latter we are unacquainted with the precise changes which the cells undergo. Assuming the correctness of the general opinion, that the axis cylinders of the nerve-fibres are continuous with the granular interior of the nerve-cells, it seems almost a necessary consequence that disordered and hurried nutrition of the latter would communicate itself to the axis cylinders, and so give rise to abnormal sensations and disorderly motor impulses.

The quality of delirium undoubtedly varies greatly. By this I do not mean merely that it may be tranquil or violent, but that though eminently "ferox," it may, nevertheless, differ so much in different instances, that it requires diametrically opposite modes of treatment. Perhaps it would be more correct to say that the patients' systems who are the subjects of delirium differ greatly in their reaction towards remedies. At any rate, the clinical fact is as I have stated it. Proofs of it will be adduced in several of the subjoined cases, and the practitioner will supply others from his own experience. How difficult a right discrimination of the quality of delirium may be appears strikingly from a case recorded by Graves (*vide* 'Clin. Med.,' p. 175), where the patient is described as violently delirious and unmanageable, on the borders of frantic madness, with a pulse almost uncountable from quickness and exceedingly weak, with cold extremities, on the eighth day of maculated typhus. Graves says a very few leeches would kill him, blisters would be too slow in their action, and might even aggravate the disease; cold affusion seemed inadmissible. Yet this man took in less than forty-eight hours 12 grs. of tartar emetic without any prostration being induced, while the cerebral excitement was calmed, sleep induced, and the pulse rendered slower and much softer and fuller. It is true that he was a young man of powerfully athletic make, and presumably in good health before the onset of the fever. These circumstances would doubtless make him more tolerant of depressing remedies, but, nevertheless, one could not but have felt fearful for the result. Many a patient in an apparently very similar condition would not have borne the antimony, and might have needed opium in large doses, and stimulants. How to distinguish cases that appear so similar and differ so widely is a great problem, and I can contribute but little to its solution. The urine, I fear, does not aid us much. Phosphoric acid may, I know, be abundant in the urine of a patient who bears lowering treatment well, but I do not know that its scantiness would prove the necessity for stimulants, at least if much less food than usual was taken. The quality of the first sound of the heart should be considered, if it were decidedly weak depressants would be hazardous. A sphygmographic tracing (if obtainable) might afford important information. The more it approached to what Dr. Anstie designates the typhoid form of pulse wave, the more clear would it be that depressants were inadmissible. A temperature above 103° would have much the same significance. On the whole, I should be most disposed to be guided by the effects of stimulants. If these lowered the temperature and procured some calm, it would be clearly desirable to persevere with them, but if they increased disorder depressants might be tried. Such testing of the system of the individual often gives information which can be obtained in no other way.

The principal causes of delirium are mental *παθηματα*, the miasms of fevers, certain toxic ingesta, and retained excreta, irritations and injuries of various kinds. To a greater or less extent the effect of all these is modified by the state of the recipient system, which undoubtedly varies much both in different individuals, and also in the same person at different times. As regards individuals, Dr. Buchanan affirms that all cerebral symptoms are severer, and the delirium is commonly earlier and more active in persons of a better class in life when they happen to contract typhus fever, probably on account of the habitually greater activity of their brains. Dr. Russell, who noted 300 cases of typhus at Glasgow, describes the cerebral symptoms as very various, and mentions that two brothers were affected with a remarkable form of busy delirium, both I suppose having inherited the same peculiarity of brain. Mr. Marson writing of smallpox remarks that persons of plethoric habit and free livers are very apt to have delirium with a nervous tremulous manner and sleepless nights.

To the occurrence of delirium from mental causes a peculiar interest is attached, because we have here an unquestionable instance of an immaterial cause producing material effects quite similar to those produced by a demonstrable substance. In this case we certainly cannot regard force as a mere condition of matter, for the excited state of the latter is evidently due to a prior immaterial agent.

The following admirably-described case, reported by Dr. Crichton Brown ('Med. Mirror,' March, 1866), affords a good example of delirium from a mental cause.

CASE 1.—A. B—, a fragile youth of strongly nervous temperament, and hereditarily predisposed to mental disease, after a long series of misfortunes and reverses, was suddenly informed by telegraph of his unexpected accession to what was to him comparative opulence. He was indescribably astonished and overcome by the intelligence, and a friend who was with him at the time was so struck by the pallor which overspread his face upon reading the message, that he inferred it conveyed the news of some sad calamity. A. B—, however, soon recovered his composure, and then manifested that elation of spirits which the circumstances fully warranted, rejoicing over his success with all the intense exultation of an impressionable disposition. In the space of an hour, however, he began to find that his high spirits were getting the better of him, that he was flushed, and roused, and restless, so that he could not sit still nor refrain from laughing, talking and moving about his room. He still attributed all this to the natural rebound of his mind on the removal of a load of care. He concluded that a walk in the open air would speedily soothe and tranquillise him. But so far from this being the case he discovered that the excitement only increased upon him as he strolled about, that he began to grow giddy and to lose command over the procession of his thoughts. He now became alarmed at his condition, for he retained sufficient sense to realise that the extraordinary hilarity under which he laboured, and which was already beyond his control, must be the result of some derangement within him. Assisted by his friend he made his way home, but by the time he arrived there he was singing aloud in the street, and conducting himself with ludicrous impropriety. Medical assistance was now summoned. He was found lying upon the sofa loquaciously discussing the most varied topics, fiercely gesticulating, bursting now and again into fits of inexplicable uproarious laughter, and exhibiting no little irritability of temper when contradicted or interfered with. His observations displayed considerable sharpness; and his friend remarked that he seemed to have assumed new powers of wit, sarcasm, and repartee. He was perfectly conscious that he was not himself, and even shed some maudlin tears when stating this fact, stopping short in his weeping to launch forth into new absurdities. His face was flushed, his head hot, his features animated, his eyes suffused. His pulse was 100, full and bounding to a singular degree for so feeble a frame. It was at once suggested that he was under the influence of wine, but this was positively denied both by himself and his friend, the latter also intimating that he was of strictly temperate habits, and had tasted nothing stronger than tea for twenty-four hours previous. Cold affusion to the head was recommended, but to this he would not submit. After this the excitement became more intense, and gradually passed into a species of delirium. His ideas became confused, he divulged scraps of the most preposterous and incompatible schemes for his own future. He insisted upon writing letters to all his relations, and only covered a sheet of paper with unintelligible scribbling; his remarks became incoherent and incomprehensible, while his voice became thick, his articulation slow and laboured, his expression dull and vacant, all his movements tremulous. He fell off a chair on which he was sitting, and staggered when crossing the apartment. He now (seven hours from the commencement of the attack) vomited freely, after which he became calmer and more collected, but had singing in his ears and severe frontal headache. The vomited matter, half digested, had not the slightest odour of any kind of stimulant. Cold affusion being now permitted was freely employed, as the head continued hot and the pulse full. It was immediately followed by heavy sleep, which lasted for seven hours, from which A. B— awoke next morning tranquil and rational, but labouring under nausea, headache, and a feeling of great prostration. Vomiting returned in the forenoon, and about midday there was a slight renewal of garrulous excitement. Hydrocyanic acid was ordered, ♏iv every twenty minutes, which, after two doses, had the effect of soothing the nervous irritability and relieving the sickness. There was no further relapse, and two days later the patient was going about as usual in his ordinary health.

Dr. Crichton Brown is quite satisfied that the disorder was not occasioned by any alcoholic stimulant, and therefore views the case as one of psychical intoxication, in which violent and irregular reaction of a brain already debilitated and preternaturally mobile was occasioned by a powerful emotion. The functional power, he says, of the vesicular neurine of every brain has a limit placed to its range of healthy activity, and this limit, which is determined by constitutional conditions, culture, and habit, represents its highest possible vigour for the time being. Whenever it is forced beyond this line, whether by physical or mental stimulants, its activity becomes purposeless and morbid; it ceases to act harmoniously with other functions, and is really deteriorated and diminished, at least in its relations, rather than stimulated or increased. The position of this limit of healthy vigour is of course very various in different persons and in the same person at different times. It is enlarged by diligent cultivation, and circumscribed, as in the case before us, by mental tension or bodily disorder. Dr. Crichton Brown seems to consider that the emotion told principally on the vaso-motor nerves of the cerebral arteries, and that the symptoms resulted from hyperæmia due to their relaxation. To me it rather seems that the cerebral excitement was primary, that the normal action of the nerve-cells of the hemispheres and mesocephale was deranged by the surprise, and that the alteration in calibre of the blood-vessels was secondary to this disturbance, just as Schr. v. der Kolk considers it to be in epilepsy. The case is most properly termed one of *psychical* intoxication, for I have no doubt the mental stimulus was exactly the equivalent of the physical ones, alcohol or opium, which produce by their direct action on the nerve-tissue toxic phenomena so very similar.

The subject of the following case was under my own care.

Case 2.—T. H—, æt. 52, admitted November 23rd, 1866. A very strong made, large, hardy-looking man, who has achieved well-deserved repute by his able and successful management of a well-known life-boat. I saw him first October 29th, when I made the following notes. About six years ago he got a fright while he was out with the life-boat, from a man being washed overboard. "He felt his inside run round," and he became giddy, but did not lose consciousness and went on with his work. He never got quite right after that night, his head has been affected ever since. Before this happened, on one occasion he was pitched out of the life-boat into a vessel and hurt his shoulder. His left knee has been injured also in the same way, but he does not seem to have hurt his head at any time. At present he is quite unnerved, gets no sleep at night, being troubled with dreaming and fancies, in fact has a degree of delirium, does not know what he is about. Has much sweating at night, and is either all on a work, as his wife describes it, with his arms and legs, or else he is busy electioneering, or cutting arms and legs off, or singing, &c. The tip of his tongue gets very sore, too, at night. Every morning for years since he has been ailing he has vomiting and purging when he gets up in the morning; it does not occur during the day if he keeps quiet. Is so irritable; if he worries himself at all he gets all in a tremble. Is often obliged to come home and go to bed two or three times a day. His limbs are full of aches and pains in blowy weather. His memory fails very much. No paralysis. Pupils normal; no strabismus. Head not unduly warm. Is not anæmic. Manner quiet. Has always been temperate. Appetite bad, tongue natural. Is worse than he was a year ago. At the time of his admission he was rather better than he had been a month before, since he had kept quite still, and done no work. An intelligent observer who took great interest in his case described him as a wreck. His urine was of sp. gr. 1020, of full red colour, not albuminous. He was ordered strychniæ, gr. $\frac{1}{20}$ + acid. nitrici, ♏ij + tr. valerian, ʒj + infusi valerian, ℥j *ter die*, morph. muriat, gr. $\frac{1}{3}$ + extr. hyoscy. gr. iv *o. n.*, and for diet half ordinary, cocoa, ale, Oj, brandy 4 oz. During the earlier part of this stage in the hospital he complained of trembling, numbness, and tingling of arms and legs coming on intermittently, of bad headache followed by black spots before his eyes, itching of head and back of neck and forgetfulness. The dose of strychnia was raised to gr. $\frac{1}{20}$, and the valerian was replaced by quin. disulph. gr. iij, and this again by gr. viij of citrate of iron and quinine. By January 30th he had recovered so far that he had lost almost all trace of nervous disorder and returned home well and hearty, though by no means capable of resuming his former arduous exertions.

The strain on the physical mechanism in this case must be admitted to have had some share in the causation of the disorder as well as that on the mental. The latter, however, was no doubt much the most efficient agent. The diffuse character of the nerve disorder is worth remarking, sensory, motor, and intellectual functions were all involved, and that pretty extensively. The sympathetic and vaso-motor departments were not exempt, as evidenced by the matutinal vomiting and purging and the nocturnal sweating. This case shows very well how persistent derangement of the cerebral nutrition may be induced by mental influence, and if by this then, I presume, by other imponderable agencies also. We can readily comprehend the causation of delirium by some toxic agent which circulates in the blood, as alcohol or belladonna, as long as it is present in appreciable quantity. But in such instances as the two last cited the requisite conception is not that of a present poison, but of a "branle" or shake having been once given to the vital actions of the brain, the perturbation does not cease, but continues indefinitely. When a toxic agent has been eliminated, and a little time has been allowed for recovery, a well-constituted nervous centre reverts to its normal mode of working, and all disorder is at an end. But where the *vital power* of the tissue has been materially weakened by a severe shock or a prolonged strain, recovery does not take place when the cause ceases to operate, nor, as in the present instance, may it tend to ensue at all, unless some other agency of an opposite kind be brought into play, which may recreate the impaired power. To have clear views on this point seems to me all-important in dealing with most cases of nerve disorder not dependent on structural lesion. To this head of deranged vital actions, either spontaneously (apparently) occurring, or as the result of some shock or disturbance or enfeebling cause, we must refer, I think, the great majority of cases of epilepsy, of chorea, of neuralgia, of insanity, of delirium, of collapse, and of true delirium tremens (not delir. ebriosorum). The nature of the nervous disorders in this case is very suggestive as to the quality of the pathological process from which they resulted. The essential features of the former were excitability and weakness, and it seems difficult to connect these with any other mode of nutrition than one which is characterised by haste and imperfection. What a catarrhal diarrhœa is to a healthy condition of intestinal action, the same we may conceive the cerebral disorder of T. H— to have been in comparison to the normal working of his brain. The tonic treatment was unmistakeably beneficial; but I am by no means prepared to say that it would have been appropriate in the earlier periods of the malady, or that it would be borne as well in another instance of as long duration.

The next instance is also one of a mixed kind.

CASE 3.—A. L—, æt. 22, light-haired, with sensual expression of face, was seen by me April 13th. He filled a post of great trust in an important business, and when taken ill suddenly had a very large sum of money about him. His father informed me that he had always led a quiet, regular life. Recently he had been ailing somewhat, his nervous power no doubt giving way in consequence of want of sleep and solitary vice to which it was found he was addicted. He told me afterwards that he had slept very badly for a long time. He had recently been subjected to much religious excitement. His general condition appeared to be tolerably good, his pulse was about 90, rather full and forcible, his eyes moderately injected, his head notably hot, bowels confined. He was much excited, his mind filled with religious and amatory fancies. Yesterday he had several doses of liq. opii sedat., about ʒij altogether, and slept for a time, but at night he became violent and it was discontinued. This morning he became violent, and had to be removed to a separate ward. While there he jumped out of bed and behaved very demonstratively towards a female who came into the room. At 2 p.m. he was ordered ant. pot. tart. gr. ½ + liq. opii sedat., ♏x + aq. ℥j *2dis horis*, and when seen at 10 p.m. he had taken several doses, but was still very excitable, declaring that Shakespeare was Beelzebub, and Byron Apollyon, and that he was going to have a lady of exalted station for his bedfellow that night. The urine passed was rich in phosphoric acid, 3 oz. contained 4·15^{7}grains, and as the total quantity appeared to be about the average it is probable that there was at least no diminution in the excretion of this ingredient, the total amount being 37·35 grains if the total urine was 27 oz. On the 21st, when he was quite convalescent, 3 oz. of urine contained only ·62 grains of phosphoric acid. He took food well, his pulse remained steady and quiet, was 72 on 17th, when he appeared quite rational, was quieter in his manner, and his attendant reported that "he had dropped all that talk about women." Before this his language had been very foul. On the night of 17th he slept well for the first time with gr. j of morphiæ muriatis; the previous night the same dose had very little effect. The antimonial was continued without the liq. opii after the 14th, until the 17th, when potas. bromidi, gr. 30 + aqua ℥iss *quater die* was substituted for it. This medication, however, did not agree so well, his head became hotter, and excitement recurred; he had worse nights, and the pulse rose to 96. On the 20th the antimonial was resumed *4tis horis*, and he was soon better, slept well on night of 21st and left the hospital on 22nd.

It is very observable how the exciting causes of the maniacal delirium in this case expressed themselves in his raving utterances, which might be described as a nauseous combination of cant and of obscenity. Truly on such occasions it seems as if demoniacal possession was still a sad reality. The antimonial acted as well as one could have wished, causing no disorder or prostration, no loss of apppetite, but simply reducing cerebral excitement. It was evidently superior to opium or bromide of potassium.

The two following are instances of melancholic mania, a condition which is of much interest to the pathologist, as one of the modes of aberration from healthy cerebral action. The different morbid sensations which we experience in the sensory apparatus seem to have their analogues in derangements of the intellectual. Numbness may be regarded as equivalent to amentia, neuralgia to melancholia, hyperæsthesia to mania.

Case 4.—Th. M—, æt. 33, admitted January 29th, a brewer, well made, tall, rather intellectual-looking. Has drank immoderately until the last four months, during which he has abstained altogether. Has always been of a studious turn of mind. Has lately had much anxiety and been badly off, out of work. No hereditary tendency to insanity. Is not subject to fits. Had brain fever when seven years old, and rheumatic fever two years ago. This morning, at 2 a.m., he got out of bed and lay down on the stone floor outside his bedroom, where he remained perfectly rigid for two hours, but had no clonic convulsions. About noon to-day he made a vigorous attempt to get out of the window, which was only foiled by his being seized by the legs and pulled back just in time. Will take no food since admission. When spoken to he does not answer for some time and then does so slowly and briefly. Pulse 100, steady and good. Temperature 99° 2′. Tongue pretty clean. Head warm. Heart's sounds normal. No paralysis. Is deaf to some extent. Eyelids constantly twitching. While I was at his bed-side he got out, knelt down by the bed, and prayed audibly. Bowels open. Ord. diet, porter Oj, potass. bromid., ʒss + m. c. ℥j, *quater die.* 30th.—Was excited last night about 4 a.m., and could with difficulty be kept in bed. Pulse good, 80. Temperature 99·5. Urine not albuminous. Takes food. Has had the cold douche for a few minutes twice. Pt. c. mist, *3tiis h.* February 1.—Improving, is tolerably rational during the day, but gets rather excitable at its close, and at night is restless, gets in and out of bed three or four times, to say his prayers. Does the same in the middle of his meals. Appetite good, wishes for more food. Pulse 66, quiet, soft. 3rd.—Is low spirited and mopy, is up and dressed; pulse weak, not distinct, 93. Continues to be restless at night. Pt. c. mist. morph. muriat, gr. j, *o. n.* 5th.—Has slept quite well the last two nights with the morphia. Seems quite recovered, and rational. Plays backgammon and has been out in the garden. Discharged.

I doubt whether the morphia would have acted so well in this instance had it not been preceded by the bromide. This took the edge off the irritability of the brain, and then the sedative stimulant came in at an advantage.

Case 5.—A. B—, æt. 63, male, seen July 15th. Has had similar attacks of melancholia before, always preceded by influenza; the present is he says the worst. Is in pain all over, cannot endure his distressing sensations, says that he shall go out of his mind, that in fact he is already a maniac. Has some suicidal propensities. His great fear is that he is living quite beyond his means and will have to go to the workhouse. Wanders about his house in a fidgety restless manner. Declares that he gets very little sleep at night, that he has had no refreshing sleep for several months, but this statement is contradicted by his friend, who says that he sleeps tolerably. His circulation is good, pulse rather full, head and hands fully warm. His food he says does him no good, he is losing flesh. Tongue whitely coated. His manner implies nervous erethism, alarm, anxiety, distress. In this and in other attacks he gets some disorder of the innervation of the muscles of the eyes, squints to some extent. Has been treated for liver and stomach without much advantage. Is naturally of a humorous turn of mind. Potass. bromidi gr. xxx *ter die sd.* 23rd.—Complains much of rheumatic stiffness of limbs. Seems less excited, but is still much so at times. Seems less intensely miserable. Still has suicidal tendencies. Pt. olei. morrh. ʒij *semel die.* August 2nd.—The bromide has depressed him very much, made him speak thick, and unable to articulate properly, and rendered him altogether very like a man in the early stage of drunkenness. It has been left off since 29th ult., and he is to-day better than he has been since this illness came on. By September 9th he was very nearly well; he had just returned from Ramsgate, where he had been fourteen days. He had lost the delusions, and but seldom had fits of depression. He still made some complaint of rheumatism, which was probably myalgia, as it was brought on by walking for two miles and ceased when he was quiet.

The relation of the melancholia in this instance to influenza is noteworthy. The latter often induces vertigo, or neuralgia, but here a higher centre was affected. The alteration effected in the natural temperament was remarkable. The action of the bromide was depressing, but calmative.

Instances of delirium produced by toxic agents are common enough, and the practitioner should remember the possibility of his having to deal with them. Pereira quotes a history, from Kircher, of two priests who ate hemlock root by mistake, became raving mad, and mistaking themselves for geese, plunged into the water. The same writer in his article on 'Euphorbium' says, "Individuals who have been exposed for some time to the influence of this dust, suffer with headache and giddiness, and ultimately become delirious. An old labourer assured me that this substance produced in him a feeling of intoxication, and I was informed at one drugmill of an Irish labourer who was made temporarily insane by it, and who during the fit insisted on saying his prayers at the tail of the mill-horse. Dr. Gosset Brown ('London Hospital Reports,' 1866) records the case of a nobleman having pertussis, for which he was ordered a belladonna liniment. Two days later the pupils were extremely dilated, he could only read letters placed at the other end of the room, his countenance was anxious, and he spoke excitedly. Pulse 126, small and compressible. Contrary to the advice given him he continued the use of the liniment. In the course of the following night the patient fancied that he saw a woman lying on the sofa in his room, an old woman covered with vermin in the corner, and some one else inside his wardrobe, which he carefully locked to prevent the possibility of escape. In order to discover how these visitants had found access to his rooms, the door of which was fastened, he had climbed to the top of the wardrobe, and in this position was found by his valet on going to call him. This condition of things not being considered satisfactory in the hotel where he was staying, a learned psychologist was sent for, who signed a certificate of insanity, and three keepers were in attendance when Dr. Gosset Brown's timely arrival brought about an éclaircissement. Next morning all the symptoms of poisoning were gone, and the patient was quite disposed to talk freely over the incidents of the preceding days. Upon one point, however, he was certain, viz., that there had been really an old woman covered with vermin in the corner of the room, for he had placed a vessel over one of the insects crawling on the ground. I challenged him to produce the animal, when (upon his very cautiously raising the basin), to the amusement of both, a small piece of down which had escaped from the pillow appeared.

In any instance where the derangement was distinctly traceable to belladonna the antidotal influence of opium should be tried, which is now attested by some notable evidence.

An interesting "case of insanity depending on Syphilitic infection" is recorded by Mr. W. Smith, of Clifton. A young professional man was attacked with acute mania of several weeks' duration. The case was marked by febrile symptoms, active delirium, and tendency to violence. When this stage had passed over the patient fell into a condition of profound melancholy and listlessness. The appetite and sleep were good, but the bowels were obstinately constipated. At the end of three months it was to be feared that the patient would pass into a condition of hopeless dementia. A syphilitic roseola pretty extensively diffused was now detected; and suggested the administration of Pot. Iod., which was given in gr. v

—x doses *ter die*, together with a mild mercurial. The patient was much better in a month and recovered completely. He admitted having had a simple chancre three months before the attack of insanity (v. 'Brit. Med. Journ.,' 1868, vol. ii, p. 30). The record of this malady seems to me to point much more to a state of toxæmia than to any meningeal inflammation, internal nodes or gummatous deposit.

Active delirium in Rheumatic fever is, in the great majority of cases, the result of an increased excitability of the nervous tissue, and is not dependent on inflammatory movement. In the cases referred to by Dr. Fuller, where actual meningitis had occurred, the delirium had been rather of a low kind. Dr. Copland distinguishes two sets of cases, one where delirium or mental disorder occurs in the course of acute rheumatism, without any abatement, or but little either of the fever or of the local disease. In these cases, he says, the head affection is chiefly nervous, and contingent upon the febrile condition, in connection with the depression of nervous or vital power. In the other the head symptoms appear at an advanced stage of acute or sub-acute rheumatism, and are generally followed by the subsidence of the disease of the joint. The patients are exhausted or cachectic, and the head symptoms are more or less indicative of inflammatory irritation of the brain or its membranes.

Dr. Todd ('Clin. Lect.') describes the delirium of rheumatic fever as coming on suddenly or gradually, resembling delirium tremens in its general character, but with less nervous tremor. "The patient is busy, restless, talkative, picking or pulling the bedclothes, frequently rising in bed, and wanting to get out of bed, reaching out his hand as if to catch hold of some object before or behind him, and sometimes—a most unfortunate symptom—obstinately refusing to take either food or medicine." Antiphlogistic measures have proved pernicious in Dr. Todd's hands, and he states on the evidence of autopsies, "that there is no more inflammation of the brain or its membranes in these cases than in delirium tremens. The membranes are perfectly free from abnormal deposit, the pia mater is pale, and the grey matter of the convolutions remarkably so, and the subarachnoid fluid is increased in quantity." He refers the delirium to the brain being feebly furnished with a poisoned blood, which is poor in colouring matter, and abounds with water. The delirium is sometimes suddenly succeeded by coma, which proves fatal, or the patient dies suddenly in the midst

LEEDS SCHOOL

of some effort in the midst of his raving. Sometimes, again, coma supervenes rapidly with dilated pupils, though there may have been little or no previous delirium. Dr. Ringer reports three autopsies of cases of this kind, attended with great elevation of temperature, in which the brain and its membranes were found quite healthy (v. 'Med. T. and Gaz.,' October 5th, 1867). In my own experience delirium, occurring in rheumatic fever, has not been of notably asthenic character, though the patients have evidently been of defective stamina. The articular symptoms have mostly receded when the head became engaged. No doubt cases are not unfrequent which correspond closely with Dr. Todd's description, and in which all depressing treatment would be highly improper; these, however, are not the only ones, others are undoubtedly met with which belong to a different group and in which management of a different kind is eminently successful. I subjoin the history of a well-marked instance of this kind, as well as those of some others manifesting different shades of morbid action:

Case 6.—W. L—, æt. 25, of spare frame, delicate constitution, carpenter, seen March 28th. Ill with acute rheumatism about ten or twelve days, his head began to be affected two days ago. Five years ago he was under Mr. Culpepper's care for a very severe attack of acute rheumatism, attended with endocarditis and pericarditis. Five years before that he was under my care with similar disease. On March 21st he had ten leeches to the precordia for threatening cardiac inflammation, poultices were subsequently applied, and calomel and Dover's powder given every three hours with a draught of pot. nitras, potas. bicarb. and sod. phosph. 25th.—Is nearly free from the pains and swelling of the limbs, except in the extensors of both feet; skin still exudes an offensive copious perspiration. 26th.—Gums affected. Rheumatism has quite disappeared, just as it did five years ago suddenly while the pericardium became inflamed. Calomel omitted, Dover's powders and salines continued. 27th.—In the course of the night he became quite delirious and incoherent, uttering alarming shrieks so as to disturb the neighbours, with fits of fearfulness and apprehension that the ceiling was about to fall, &c. Eyes wild and restless, can scarcely be made to comprehend any question. Head hot and skin generally. Tongue dry and covered with yellow crust. No urine passed since last evening. Hands are tremulous as in delirium tremens. Hair cut short and cold applied to the head, hot mustard fomentations to the feet. Opii gr. i *3tiis horis*, with effervescing draughts. Furious delirium continued all the day, four persons were required to keep him in bed; he would not take the pills or mixture. At 5 p.m. Mr. Culpepper gave him gr. j of opium, and at 9 p.m., gr. ij, matters were then greatly worse. At 11 p.m. Mr. Culpepper was sent for, the patient was said to be in a strong fit of convulsions. When he saw him he was in a terribly excited state, eyes staring, jaws clenched, heart beating violently. Pulse 130. Great heat of surface. Tr. digitalis ʒij, + tr. opii ʒj, was directed to be given in two doses, at 12 and 3 a.m. At 6 a.m. he had liq. opii sed., ʒj in two doses. I saw him with Mr. Culpepper at 9.30 a.m., and learned the above history, and that he had had no sleep for two nights. Pulse 117, of good force. Tongue denuded, cracked, red, covered with sordes. Is partially conscious, does what he is told, says he has no pain anywhere, is constantly talking deliriously. Rheumatism has quite disappeared in spite of counter-irritation to the limbs. Urine passed in bed. Head rather hot. Heart's sounds fairly clear, no pericardial effusion, slight questionable exocardial bruit. Right pupil dilated until lately, is now of medium size and fixed. Left eye lost. No pneumonia or bronchitis. We agreed that he should have six leeches to the temple, cold to his head, and gr. ¼ of tartar emetic every half hour. 31st.—He began the treatment at 11 a.m. of 28th, and took gr. ¼ every half hour till 11 p.m., when the pulse was 95, the skin was cool, and the delirium nearly abated; in short, everything going on well, which induced Mr. Culpepper to give the mixture less frequently, every one or two hours. At 5 a.m. of 29th he was not so well, so the mixture was given as before with liq. opii sed. ♏iv in each dose, and from that time to 10 p.m. of 30th he has made rapid and permanent improvement, and is now quite himself again in every respect, asking for and taking food, and knowing everybody about him; delirium quite ceased. In fact, but for the return of the pain and swelling of the right hand, one could not say what had been the matter. The left shoulder is also painful. Complexion clear, countenance calm, pulse 86, and respiration tranquil. April 1st.—Sleeps and eats well, omit the antimony and opium. 2nd.—A light tonic with sodæ phosph. was given, as the urine still deposited lithates. Joints free from rheumatism. 6th.—Is up and dressed and considers himself quite well. Mr. Culpepper, to whose kindness I am indebted for the report of the case, adds that during the four days he took over 30 grains of tartar emetic and ʒij of liq. opii sedat. Rheumatic pains reappeared on night of 29th and continued till April 3rd, all other symptoms gradually but most distinctly abated, and not the slightest bad effect was produced by the antimony, no approach even to nausea or sickness, or purging, or depression of the heart's action. After the 30th the medicine was given less frequently. *Remarks.* — There can be no question that the tartar emetic was really the efficient means of this patient's recovery. Opium had been taken previously without benefit, and was not given the first day, when, nevertheless, a considerable sedative effect was produced. The relapse which ensued when the antimonial was given less frequently, and the steady improvement after it was resumed at the former rate, prove that it was the chief remedial agent. Its action seems to have been remarkably limited to the brain calming the excitement of its tissue without producing any notable effect. The case was evidently not one of ordinary rheumatic fever delirium, there seems to have been actual metastasis of the morbid action from the joints to the brain, with subsequent recurrence of it in its usual site. Considering that the heart had been severely attacked before, I think it is very doubtful whether there was any actual affection of it on this occasion. If there was it was slight, and had I believe no connexion whatever with the cerebral symptoms. Altogether the case may stand for a Παραδειγμα of sthenic delirium.

The following case related by Dr. Posner[1] is worth comparing with the foregoing:

Case 7.—A man, æt. 37, fell ill of acute rheumatism. Both hands were affected, the pulse was 100, and the other symptoms were as usual, except that he was remarkably restless. The inflamed parts were much relieved by leeching, but the elbow-joints became engaged, and the upper arm and neck muscles were painful. On the next day, after considerable delirium, the joints became quite painless, the pulse was 65; the patient only complained of occipital pain. There was no indication of intercurrent delirium tremens, the cerebral disorder was viewed as a rheumatic meningitis, and treated by local detraction of blood, and ice applications, with tartar emetic and opium internally, and mustard poultices to the joints which had been inflamed. The delirium continued two days and nights in spite of repeated bloodletting, the pulse fell more and more, and the joints remained painless until large doses of opium were administered, which produced on the third night sleep for seventeen hours, out of which the patient awoke rational, but with severe pains in the neck and stiffness of the elbow-joints. The pulse had risen moderately, and the general condition was better. After a second tranquil night the pain returned in the joints which had become affected with all its former severity, and this condition lasted some days, when it suddenly ceased, and in its place the old cerebral symptoms returned. These yielded again to the opiate treatment, and the joints became affected for the third time, and remained so until the disorder disappeared entirely in about fourteen days. The heart was never attacked.

Case 8.—Mr. L—, æt. 25, a delicate man, seen in consultation with Mr. G. Brown December 13th. He had been ill about ten days suffering with rheumatic pain, and latterly with some pleuro-pneumonia of both lungs at the posterior bases, most marked and extensive on the right. Respiration very quick and shallow, 60 in the minute. Pulse 108, weak. Skin cool. No cough or expectoration. Extreme thirst. Tongue thickly coated. Heart's sounds normal. Ordered mist. pot. citrat. efferv. ℥j, tr. opii ♏vj, pot. iod. gr. jss, spt. æth.

---

[1] 'Med. Centr. Ztg.,' xxviii, 27, 1859.

chlor. ♏xij, 4*tis horis*. Opii gr. j, *statim*. December 14th.—Slept well, respiration 30; feels better. In the course of the following night Mr. G. Brown was sent for, as the patient had become "raving mad." He gave him gr. j of acet. morph. + gr. v of calomel, and repeated the same in two hours. This speedily quieted him, so that the following day he was quite rational. He was now well supported with a very generous diet, and made a good recovery.

Case 9.—W—, female, æt. 30 (about), seen September 10th. Has had swelling and purpuric eruption on right leg last four days, and the last two on right elbow. Leg much swelled and very tender. Is markedly weak, has not been without vegetables. In two days, with iron and quinine and citric acid, the purpura had disappeared, and two days later rheumatism commenced. Nitre and citrate of potash saline. 18th.—Was delirious all last night, is rational this morning, but intellect not quite clear. Heart's sounds normal; ordered mist. ammon. acet. ʒj. + ammon. carb. gr. iij, 4*tis horis*. Brandy ʒss, 2*dis horis*. Broth diet. Beef tea. After this there was no more delirium, but the rheumatism, though never more than sub-acute, lingered about her for a long time. She did not leave the hospital till the end of October.

The above cases affords proof, as it seems to me, of the different quality which rheumatic delirium may assume. Some cases are calmed with stimulants, some with opium, some with tartar emetic. The state of brain cannot be alike in all, and I cannot but think that where depressants are serviceable, it must approximate a good deal to that existing in meningitis.

There seems much reason to think that the exciting cause of acute rheumatism, whether it be an imponderable influence or a material virus, attaches itself especially to the nervous system, and works through it. If the nervous power is strong and steady, the inflammatory phenomena will proceed in an orderly manner to the termination of the disease. But if the reverse is the case, if the nerve power is unstable originally, or rendered so by injudicious treatment, the irritability of the brain becomes greatly increased according to the general law (v. p. 48), and it is affected in a much more intense measure than it would have been in a stronger state. This is an instance, I think, where a judicious solidism is essential to true pathology and to successful treatment. The exciting cause of rheumatic fever must be no doubt the same in all cases. Yet in the great majority the delicate structure of the brain is unaffected by the poison, or the morbid influence, whatever it be. In a few, however, who have less resisting power the function of the nervous tissue is disordered.

Among the zymotic fevers Typhus presents the most marked and frequent examples of delirium. Dr. Aitken writes that delirium may assume every character,—joyous or melancholy, furious or tranquil. In a few cases the disease assumes every character of insanity, and if permitted, the patient confined in a strait-waistcoat presents the extraordinary spectacle of being able in typhus fever to walk about the wards. Some of Graves' forcible descriptions are well worth citing. A man, æt. 25, about the tenth day of typhus, was found in a high state of excitement, as manifested by continual mental wandering, incessant talking and raving, and frequent attempts to get out of bed. He had illusions of the senses of sight and hearing, consisting of terrific ocular spectra, and alarming sounds, which threw him into a state of intense agitation; his eye was red and watchful, and he never slept. His respiration was interrupted and irregular, and his pulse 120, soft, and very weak. Another case, on the fifteenth day of the fever had been perfectly unmanageable, continually screaming and imagining she saw frightful apparitions, and convulsed during the night. She lay with her hands outstretched and rigid; a mixture of terror and wildness in her face, her eyes red and protruded, pupils contracted, pulse not to be counted and scarcely to be felt, feet cold and stiff. When spoken to she made no answer, but kept her eyes steadily directed towards the foot of the bed. Her aspect was altogether frightful, and her state appeared to be a combination of delirium with hysteria. Both the above cases were vastly improved by the administration of quarter grain doses of tartar emetic every hour or half hour, and both recovered.

The delirium in these cases undoubtedly does not depend on cerebral hyperæmia merely, but rather on a direct operation of the poison to the brain. Idiosyncrasy plays here a very important part. One brain is wrought into furious excitement by the same poison which does little more than dull and stupefy another. What seems especially wanted is to lessen the impressionability of the brain, to render it less sensitive to the action of the poison. Different drugs may accomplish this end in different persons. To a patient with a contracted pupil belladonna may prove a much better calmative than opium, and to one with a half-inflamed brain antimony, leeches, or the cold douche will be much more serviceable than either.

The paroxysm of Intermittent fever may be attended with delirium amounting to acute mania. Erhardt ('J. of Mental Sc.,' July,

1867) is cited as relating the case of a soldier of exemplary character, who in '63 and '64 had ague. In the latter year, while suffering from ague, he took a vapour-bath followed by a hot bath which occupied an hour and a half, after which the cold stage which had been interrupted by the bath returned, and was succeeded by a severe hot stage. He was hardly able to get home, and when he reached it the expression of his face was remarkably altered, and the perspiration was pouring from his forehead. He speedily became maniacal and unconscious, broke the windows and the crockery, wounded or murdered an old woman, cut off his scrotum with a shoemaker's knife which was left in the cottage, and lay down covered with his cloak, in which position he was found half an hour after. He was taken to the hospital, where he had another paroxysm of ague, but never exhibited any further symptoms of insanity. After a careful examination he was liberated as having been under transitory mania at the time of the deed. The case seems of some importance, not only as illustrating how severe may be the cerebral disturbance in the hot stage of ague, but as making it, I think, very probable that a vapour-bath or hot bath are very likely to induce and intensify such disturbance. It seems tolerably clear that this man never had mania before, either with or without ague, nor did he have it afterwards, so that it seems difficult not to inculpate the baths as the determining cause. This is the more probable because the Turkish bath occasionally has a similar effect.

Post-febrile delirium, the delirium of collapse, as it is termed by Dr. Hermann Weber, is much rarer than that which prevails during the acme of the disease. It sets in suddenly, and assumes a maniacal character with delusions of an anxious nature, and hallucinations of the senses, especially of hearing, but also of sight. The delusions are mostly fixed, but sometimes there is repeated change in a comparatively short time. In most instances the delirium commences in the early morning, and almost always immediately after waking. The duration of the delirium (treatment being adopted) was short, extending from about eight to forty-eight hours. The means employed by Dr. Weber were opiates in rather large and frequently repeated doses, restoratives, artificial warmth to the cold extremities, and food. The opiates were borne remarkably well. The period at which the mental disorder occurred was when the original pyrexia had almost ceased. The thermometer in most instances showed that the temperature was a little above the normal, but the hands and feet and face were cold, and the general appearance that of prostration or collapse. The pulse was weak and rather frequent, in some irregular. The following is an abbreviated account of Dr. Weber's fifth case from the 'Med.-Chir. Trans.,' vol. xlviii, p. 147. C. F—, æt. 22, of anxious disposition, and who had been undergoing a good deal of anxiety for some months, got an attack of one-sided pneumonia, which progressed favorably and was disappearing, when on the eleventh day he became suddenly much excited, being under the impression that the house in which he was employed was being ruined through a mistake of his. The delirium commenced at 4 a.m., and when seen five hours later he was quite maniacal, wanting to jump out of the window, having broken two panes of glass, having severely struck a near friend of his, and being with the greatest difficulty kept in his room by three persons. When calmer for a few minutes, he said that his employer and many other houses were ruined through him. Expression of extreme anxiety and great collapse; face pale and cold; eyes sunken; hands and feet cold; perspiring profusely; pulse 105, very weak and irregular, temperature 98·6. He was ordered morphia gr. $\frac{1}{3}$, *2dis horis*. Port wine, ℥ss *o. h.* At 9 p.m., after six doses of morphia, he fell asleep, and slept until about 4 a. m. of the next day, when he seemed to be still under the same delusion; after another dose of morphia, however, he slept again for three hours, and on awaking was more rational. Pulse 84. Temperature 97·7. Hands and feet warm. Expression of face composed, less pallor. His further progress was satisfactory.

In most of Dr. Weber's cases there had been little or no delirium during the primary illness, which is a very noteworthy fact, and renders it highly probable that the derangement was not directly produced by the special fever miasm. The occurrence, however, of delirium during the pyrexial period would, I conceive, decidedly increase its liability to recur during that of commencing convalescence, since the equilibrium of the nutrient actions of the brain would be deranged, its functional power impaired, and its tendency to fall into collapse materially increased. Such was the case in the patient whose history I proceed to relate.

Case 10.—B. S—, æt. 12, admitted March 1st, 1866, had recently passed through a severe fever, in which she was highly delirious, requiring two or three persons to restrain her. Her hair had been cut off, and she was very emaciated. A fit occurred the day after her admission. When I saw her, March 9th, I was struck by her appearance as she lay in bed. Her manner was excited; her face had a determined, but rather wild expression. She used the most foul and abusive language to me as I stood by her side, repeating the same statement or question to me again and again in a loud insisting voice. She had been in the same delirious state ever since she came in, and tried sometimes to get out of bed. She passed all her urine, and often her stools in bed, and always would if not watched. The motions were very healthy. Her appetite was very good, she ate ravenously. She had not slept well at all until last night. Forehead warm; pupils large; tongue clean; pulse 105, weakish, sharp; heart's sounds normal, action sharp. She was better all the morning till about 1 p.m. At times the nurse said she behaved as nicely as possible, spoke properly, and thanked her for her care. Her medicine was small doses of quinine, and she had four ounces of port. March 12th.—She was calmer, but became excited at times, looked intently and eagerly at me with a fixed gaze as I stood by her bed; took my hand and tried to remove the ring, but did not speak. A bottle of stout and six ounces of port daily. A fortnight later she was quite calm and rational, but still had a peculiar eager gaze. April 10th.—She was discharged.

The patient's mother seemed to be a very respectable woman, and was much surprised at the language her daughter used in her raving. In this instance there could be no question as to the system being generally in a state of collapse or prostration, and as little that the brain disorder depended essentially upon this condition. It is surely a very remarkable thing that such a state as this should give rise to excessive, though unnatural, activity of the brain. It does not necessarily do so, for more or less prolonged dementia and paralysis are well known results of the same antecedents. How great the difference between the constancy with which inanimate substances respond to the agents that affect them, and the varying changes manifested by living bodies when similarly tested!

Dr. J. W. Ogle has recorded ('Brit. Med. Journ.,' 1867, April 6th) some highly interesting instances of brain disorder occurring as sequelæ of fevers, which I shall try to summarise here. Case 1 was that of a lady, æt. 35, married, but without children. She was of highly nervous temperament, clever and accomplished. After receiving a mental shock she was attacked with measles, and when recovering from the immediate effects, the rash having nearly subsided, she became one evening odd in manner and excitable. By the following evening she was quite out of her mind, walking about the room, talking loudly, imperiously commanding attendants, refusing to lie in bed and take food, and angry to a degree with her husband. If not thwarted she was in most good humour, smiling and talking rapidly and wittily about every conceivable person and thing with which she was conversant. She had no fever, no unpleasant sensations, but was quite sleepless. After a time she refused food to a great extent, and in spite of such sedative and stimulant remedies, and food as could be given, she passed five or six days and nights without sleep of any kind. The pulse and heart's action became more and more feeble, and at last the vessels of the conjunctiva became congested. During most of this time she continued in a maniacal and delirious state, and so sank and died, having only at last had a few hours of disturbed sleep. At no time was any form of convulsion or paralysis noticed, nor was albumen found in the urine. Case 2 was one of high delirium resembling acute mania, occurring in the course of scarlatina. The delirium differed from that of ordinary febrile excitement, and during its persistence there was no heat of blood, no ferrety look of eye; the pulse was quiet, and the skin was cool. Case 3 was characterised, not by delirium, but by epileptic seizures of a peculiar interesting nature. The patient, a man of middle age, at the end of about the third week of typhoid fever, had a very severe epileptiform seizure. During the succeeding eight or nine days he had a good many, the convulsion latterly becoming limited to one arm and one leg, or to one leg only. At about the end of this time, while one leg was twitching, he was not able to speak distinctly enough to be understood, and a condition followed in which, whilst having all his mental faculties, and knowing what he wished to say, he was nevertheless quite unable to speak. He would stutter and stammer, but uttered nothing intelligibly. These attacks of loss of articulating power did not last long, and he soon was convalescent.

The chief conclusion which these cases of post-febrile delirium and convulsion suggest, is the great importance of the dynamical condition of the nerve-centres apart from that of the blood. The latter may be very abnormal, may contain active poisonous matter, as is doubtless the case during the increase and acme of the pyrexia, yet nerve disorder may not ensue until recovery has actually commenced, and healthy nutrition begun to return. In other very similar cases no disturbance at all takes place at any time. The nerve-centres evidently possess more resisting power, are less liable to be deranged from their orderly working in some individuals than in others, and at some period than at others. This fact deserves to be well considered by those who make the existence of the poison in the system the prime matter. As a corollary from the above conclusion I would lay stress on the evident importance of sustaining the fever patient efficiently while he is passing through the stress of his disease, even though his nerve power shows no trace of giving way, lest like the Epirote king, though victorious in the strife, the consequent exhaustion should be ruinous.

The hysterical state sometimes passes on into well-marked delirium, which may coexist with the convulsive paroxysm, or be almost the only symptom present. The following are instances:

Case ii.—M. M—, æt. 27, had been ill (August 28th) a few days with severe herpes of the labial and buccal mucous membrane, and was very feeble. She took bark + potas. chlor., and was fed with brandy and milk, as her mouth was too sore to take ordinary food. Decided improvement had taken place, when, on the night of August 31st, a severe attack of hysterical delirium ensued. It came on between eleven and twelve, after she had gone to bed. During the evening she had been tolerably well, and nothing had occurred, I believe, to account for the disorder. When I saw her soon after twelve she was in full paroxysm, complained of being unable to get her breath, clutched repeatedly at her throat, laughed and cried, and threw herself about, could not be prevailed on to lie down for more than a minute or two. She had delusions, did not know where she was, fancied there were thousands of people in the room, and did not recognise me plainly. She seemed to be in a sort of dream, yet had evidently some degree of consciousness, and put out her tongue when desired. She complained of chills and flushes. Pupils of medium size. Two doses of spt. ammon. fœtid, were given, but she remained till about noon the next day excited, and more or less delirious. She was then removed to St. Mary's, and had a third of a grain of morphia, which tranquillised her, and she had some sleep. The morphia was repeated at night, and there was no recurrence of delirium during her stay of about six weeks in the hospital, although the buccal eruption reappeared once or oftener. I regret that I did not use subcutaneous injection of morphia at first.

The following history is recorded by Mr. Carter:—A lady was under his care in whom a primary paroxysm resulted from circumstances which brought domestic distress of long continuance to a climax, and in whom the sexual passion was much involved. Two hours after the fit she lapsed into a state of incoherence, one idea only having possession of her mind, and being made the subject of much rambling talk. The principal symptoms besides delirium were heat of head and excessive restlessness, but the pulse was never above 80. This condition lasted nearly a week, and then, after a day or two of improvement, terminated in complete recovery, no hysterical disorders succeeding to it, and nothing but the previous circumstance of the case having distinctly pointed to its character. In the first of these cases the delirium seems to have resulted from an extension of the nerve disorder from the emotional centres to the more purely intellectual; in the second there seems to have been a metastasis from the former to the latter.

This is another instance where we find evidence of separate intracranial nervous centres being affected in a similar way by the same kind of morbid action. In violent hysterical delirium inhalation of chloroform seems to be the most efficacious remedy. M. Briquet states that hysterical paroxysms are arrested by a small quantity of chloroform vapour. He has stopped the attacks nine times out of ten by this means.

Epileptic delirium is a very much graver matter than hysterical, as might be expected from our knowledge of the ηθος of the two morbid states. Jules Falret, quoted by Trousseau, says:—"No one can form an accurate notion of the sort of rage which suddenly possesses the epileptic, and drives him to strike or to break anything he can lay hold of. During these transient attacks of furor he is so dangerous to all those around him, as well as to himself, that the attention of persons in authority, and of medical men, cannot be too earnestly drawn to these conditions of instinctive and blind violence, which all authors have pointed out as frequent results of epileptic fits. They may lead to the infliction of grave wounds, to the commission of suicides, of homicides, and arson, and yet the individual cannot be held responsible in any degree for the acts of violence perpetrated by him during this perfectly automatic, though short-lived delirium." The duration of the delirium varies considerably; it may last only a minute or two, or several hours, or several days. Trousseau relates a case in which it continued for five or six days; Falret says it may persist for twelve or fifteen. In general, the cerebral disturbance coincides with the paroxysms of convulsions or vertigo, usually succeeding them more or less closely, but sometimes preceding them, and in others, again, replacing them, so as to constitute for the time, at any rate, the sole manifestation of epilepsy.

The following history is a good example of the more ordinary mode of occurrence of epileptic delirium:

CASE 12.—C. F. M—, carpenter, æt. 34, admitted May 2nd, 1866. This morning he was quite well, was walking about looking for work. He was found by a policeman lying on the ground, but does not recollect getting within half a mile or so of the spot where he was taken up. He was seen to fall down; was convulsed while he lay on the ground; after about half an hour he was brought to hospital. He was then violently delirious, struggling forcibly, and knocked himself about a good deal in the waiting room, bruising his head. Restraint was quite necessary, and the strait-jacket was put on. He was quite unconscious. The excitement continued unchanged from the time of his admission (2 p.m.) until 3.30 the next morning, when he became quieter. During the delirium his face was much flushed, and the arteries of his head were full, and pulsating rather forcibly. Cold douches to the head were used, and in the evening the scalp was shaved and ice applied. A sulphate of zinc emetic was given. A quarter of a grain of morphia was injected subcutaneously, and later in the day half a grain. None of these remedies were of any avail. Chloroform inhalation was commenced a little before midnight, and was maintained to about 3 or 4 a.m. It was observed especially that the chloroform anæsthesia passed off at first very rapidly; if it was discontinued for less than a minute the excitement recommenced. As the inhalation was continued longer he became more amenable to its influence. At 10 a.m. of 3rd he was quiet, went to sleep, and slept about three hours, when he awoke rational, and continued so. Subsequent inquiry showed that he had never suffered before from fits, nor had any of his family, so far as he knew. He had never passed worms. His urine was healthy. In fact, no cause could be discovered for the epileptic attack (in which, by the way, his tongue was bitten), and when I heard of him again, nearly a year after, he remained quite well, and had had no recurrence.

In this instance there was no doubt or difficulty in referring the delirium to the epileptic attack as its cause, but sometimes it may be very much the reverse. The convulsive or vertiginous seizure may be very brief, and escape notice, while the delirium hurries the patient into acts of criminal violence for which he may very probably be arrested and have to take his trial. Dr. Jozat relates the following history: A young man while on his way to the Palais Royal in company of some friends with whom he was going to dine, suddenly falls down, but soon gets up again, and rushes on the passers-by, striking them with violence. He is taken to the police-station, and for some time keeps insulting the soldiers who hold him, and spitting in their faces. It may easily be conceived, as Trousseau remarks, how difficult it might be to arrive at the truth when the epileptic and the victim of his violence have been quite alone.

J. Falret describes two forms of well-characterised intellectual disturbance, constituting genuine attacks of insanity, occurring in epileptics at various intervals as irregularly as the seizures, and either with or without them. He terms one the *petit*, the other the *grand mal*, "meaning thereby to indicate the close relationship observed between the physical and the mental manifestations of epilepsy." The *petit mal* comes on with sadness, moroseness of temper, despondency, failure of memory, obtusion of ideas, and irritation against everything around them. The patients feel as if subjected from the first to a "superior force which holds their will in subjection, and drives them, in spite of themselves, to acts of violence." They wander about in an objectless manner, and are prone, in a most sudden and unexpected manner, to commit all kinds of violent acts, of which they retain no, or very imperfect, consciousness after the disorder has passed by. The *grand mal* is essentially a furious mania, whose distinctive characters, compared to other forms of mania, are greater rapidity of invasion, the terrifying nature of the predominating ideas, the frequency of hallucinations, less incoherency of language, and greater distinctness of ideas, sudden termination of the paroxysm, with almost complete obliviousness of all that has occurred during the time.

Traumatic delirium may be of very different quality in different instances, sometimes, as Mr. Erichsen states, being furious, and attended with a quick and bounding pulse and high fever; at others being low and muttering, and attended with signs of asthenia. The state of the nervous system has much to do with the occurrence of this disorder; it may supervene and prove fatal in less than twelve hours in cases of simple fracture. The condition of the individual system no doubt determines also the quality of the delirium, *i. e.* the degree in which it approximates to either of the two types just referred to. Other causes besides the shock of casual injuries may give rise in predisposed subjects to such nerve disorder as we are considering. M. Sichel, the oculist, describes in 'L'Union Medicale,' 1862, a peculiar kind of senile delirium, of a non-febrile character, which he has observed seven or eight times after extraction of cataract in old people. He attributes it solely to the occlusion of the eyes consequent to the operation. Some of his patients might have suffered from commencing delirium tremens;

but others had been most abstemious all their lives. The patients get up in the night, walk about, gesticulate, tear off the bandages, insult and menace those about them, &c., so as to require restraint. In one case all the symptoms of delirium disappeared when the bandage over the eyes was removed. This kind of delirium has never been observed in persons under sixty years of age, nor in any except those in which the operation of extraction was performed ('Brit. Med. Jour.,' 1863, Jan. 10). Photophobia is a consequence of the same as well as of other operations on the eye, and it seems to me not doubtful that this homologous sensory disorder as well as the intellectual is chiefly occasioned by the surgical lesion.

Much interest seems to me to attach to the occurrence of traumatic delirium, inasmuch as there can be but little question that the nerve disorder is dependent not on any poison or miasm in the blood, as in most instances that we have reviewed, but on the direct action of the shock through the nerves on the brain. If this should seem doubtful to any, in consequence of the delirium being often delayed to the third or fourth day after the accident, it may be remembered that in certain cases of gunshot wounds during the Crimean and American wars, the men became "insanely excited, or almost hysterical," within a very short time after they were hit. So I have seen a blister not larger than a crown-piece applied to the abdomen of an exciteable lad of fourteen who was recovering from a severe attack of peritonitis, induce a well-marked hysterical delirium, although there was no trace of urinary irritation. With the aid of a little opium the delirium soon subsided. Graves warns his readers that the irritation of blisters may give rise to sleeplessness, mental aberration, "and a train of symptoms analogous to those which characterise delirium traumaticum (v. p. 453). The good effects of full opiates in this condition seem not to admit of question. Mr. Crouch ('Clin. Soc. Rep.,' 1869) relates a case where tr. opii ♏40 4*tis horis* gave not much relief, but a dose of ♏90 was soon followed by sleep and cessation of the delirium. Opiate enemata may be preferable in many of these cases, as advised by Dupuytren.

The Puerperal state is well known to promote the occurrence of mental disorder, which may appear in the guise of mania or melancholia. It may be affirmed, however, on the authority of Gooch, that there is nothing peculiar in the malady when it thus originates, nothing that would enable an observer unacquainted with the patient's history to distinguish the condition from one of different causation. Dr. Macdonald, however, considers the intensity of the mental excitement, the excessive incoherence, and especially a tendency to profane and obscene utterances, to be characteristic. A suicidal tendency is not uncommon. The disorder usually terminates in recovery, but may extend over several months, or, on the contrary, come to an end in a few days. In the vast majority of cases, if not in all, the cerebral disorder is quite independent of active hyperæmia, or any approach to inflammation. Gooch relates three cases, in two of which the vessels were found empty, while in all the encephalon was healthy. Graves says of a fatal case under his care that "the most careful examination could discover in the brain no phenomena in the remotest degree capable of explaining the occurrence of delirium or death . . . . everything was unaltered and healthy." The uterus and abdominal viscera were healthy. Depletion appears in several recorded instances to have been distinctly injurious, and a soothing and supporting treatment beneficial. In fact, the chief risk is from asthenia. Gooch says—"In the cases which I have seen terminate fatally, the patient has died with symptoms of exhaustion, not with those of oppressed brain, excepting only one case."

Delirium, however, does sometimes occur in lying-in females under circumstances which render the use of the lancet necessary. These patients do not have mental disorder at first; in many who are similarly affected there is none whatever, and when there is (as Gooch affirms) "it follows, and is the effect of the inflammatory state of the brain; and it is never equal in degree, nor similar in kind to the disorder of the mind in mania and melancholia. It is pain of the head with fever, followed by delirium." He gives one instance in which a full venesection producing syncope evidently arrested a malady of this kind, and adds the warning founded on experience that such symptoms, when neglected or treated inefficiently, may end in hemiplegia, hydrocephalus, or furious delirium, speedily followed by coma and death. With ordinary discrimination there seems little risk of confounding these cases with those of puerperal mania, and there is, perhaps, not much probability of our having often to deal with such at the present day, but it is particularly interesting to find that Gooch did discriminate them, and ruled his therapy accordingly, and that at a time when, as Dr. Fergusson tells us, the most heroic depletory measures met with general approbation. May we avoid the temptation to onesidedness as he did. Suppression of the secretion of milk seems to have little or no effect as a cause of the disorder, but derangement of the liver and bowels is much more likely to be operative, and should never be left out of account. The removal of morbid matters from the intestines may of itself suffice to procure recovery. When this has been sufficiently attended to, and I beg my readers not to be deterred from doing so by the denunciations of the advocates of port-wine-pathy, the way is open for the beneficial administration of narcotics. These, Gooch testifies, are the most valuable remedies, and are more often successful in puerperal "than in mania occurring under other circumstances, for it is more uniformly a disease of nervous excitement and debility." The dose at first should be a tolerably full one, and after sleep has been procured, smaller doses may be given at six hour intervals. Dr. Churchill mentions having used chloroform inhalation successfully where opiates failed. Probably a combination of sedatives, such as chlorodyne, may sometimes act better than any one singly. Codeia may suit some cases where the ordinary preparations of opium are not borne well. Bromide of potassium in twenty or thirty grain doses more or less frequently (where there was not too much exhaustion might prove a very excellent calmative to the excited brain). Camphor in combination with henbane or opium is indicated where there is marked prostration and restlessness. In prolonged cases various tonics by improving the appetite and general power may render essential service.

The diet should be nutritious or even generous, according to the degree in which the patient's condition partakes of asthenia, and it is certainly better to err on the side of over than of under feeding. With regard to stimulants more caution is necessary. So long as they lower a high temperature, render the pulse less frequent and more steady, diminish raving, and promote taking nourishment, they are highly beneficial, and we need not hesitate to use them freely. If, however, their effects are the reverse of all this, they are injurious, and had better be withdrawn. In cases where only liquid nourishment can be taken, brandy with milk, or with milk-tea (about equal parts of milk and tea) is very suitable, and may be given in small quantities (one or two ounces) every hour. In certain cases and at certain times, as in very hot weather, iced burgundy or champagne will be preferable to brandy. To some iced milk alone, or iced tea-milk, will be most acceptable. When the digestive organs are in good order, bottled stout, mostly diluted with draught ale, is often an excellent restorative. "It goes all over you, and fills up all the crevices," was the testimony of one who had tried its effects. Good soups, quenaille, and well-cooked meat or poultry will be advisable, in proportion to the patient's powers of digestion, nothing being, of course, gained by taxing them unduly.

It is scarcely necessary to advert to the importance of absolute quiet in the sick room, which, unfortunately, cannot always be obtained, especially in London, where rattling vehicles, street cries, organ grinders, and even chirping sparrows, combine to keep excited brains in a state of unrest. The room should be darkened as long as the quality of the delirium betrays much cerebral excitement, but in states of melancholia and of chronic disorder the influence of light is salutary. The remarks and questions put by a delirious patient are better left unnoticed; replies only provoke further raving.

Separation of the patient from her friends is always advisable, though it is often difficult to persuade them to consent to it. It is quite remarkable how much more tractable patients generally are with strange attendants than with members of their own households, or their own relatives. A time, however, may come, as in a highly interesting case related by Gooch, when, after prolonged separation, without any satisfactory improvement, a beneficial impression on the mind may be made by a visit from some familiar face. On the other hand, if the patient is decidedly gaining ground, there is no doubt that it is better to prolong the seclusion, as a relapse has often resulted from premature return to her family. In all cases where it is doubtful whether the patient is fit to nurse her infant, the least appearance of mental aberration should warn us to press for immediate weaning.

My friend Dr. Cahill has favoured me with the following interesting case:

CASE 13.—A lady returned from the tropics for her confinement, having previously had one child and a miscarriage. Some thickening of the perinæum rendered the labour tedious and painful, but all ended well, and she went on in the ordinary way for several days. Her delusion was that she was quite lost to all hopes of salvation, and she had a dread of being poisoned, and refused food, with complete loss of rest. The injection of morphia gr. $\frac{1}{6}$ + atropia gr. $\frac{1}{96}$ subcutaneously, at once

SCHOOL

produced several hours' sleep; and food and stimulants were taken before the effects of the anodyne passed off. It was repeated four nights with equal success, and then was no longer necessary. She recovered well.

The second case was a primipara who had a tedious labour in which turning was had recourse to, and the child was saved with extreme difficulty. The mania came on about the usual period, and took the form of a determination to destroy the infant, for which, during labour, and at its birth, she expressed the greatest affection. The same injection at once produced sleep; food and stimulus was taken next morning, and after four or five nightly repetitions of the injection she was quite restored to health of mind and body. Dr. Cahill remarks that in both these cases the fever and exhaustion caused by the setting in of the secretion of milk formed the starting-point of the mania.

As regards the treatment of active delirium, very much of course depends on the nature of the affection, and the presumed pathological state. If the disorder be of sthenic character various depressant measures will be found essential. It is the fashion with some to depreciate Abercrombie, but there seems to be no question (unless we accuse him of deliberate falsehood) that he has left us most valuable records of the successful treatment of cerebral disease as it occurred in his day. I do not see if we accept his cases as truthful records that we can question the beneficial effect of general and local bleeding, and of hard purging. Abercrombie candidly states that the cases terminating favorably form but a small proportion to the whole of those he has met with, but this does not alter the fact that in certain cases this evacuant treatment was successful. I am not at all disposed to be a blind worshipper of authority; I desiderate carefully recorded observations in proof of general views, but when I have these I shall not reject or ignore them because they do not accord with my own experience. Abercrombie's testimony is fully corroborated by that of other observers, and looking at the whole, no doubt exists for a moment in my own mind as to the propriety of adopting the means he recommended when we have sthenic conditions of system to deal with. Dr. Marshall Hall places congestion of the brain at the head of the list of disorders which increase tolerance of bloodletting. It is scarcely necessary to say that if venesection be requisite, it should be performed in such a manner as to make speedy impression on the system, and induce semi-syncope. The importance of choosing the right time for venesection has often been pointed out. As a remedy it belongs to the initiatory period of inflammation, before exudation to any amount has taken place, while the heart's action is forcible, and the blood-vessels retain their tone. In tropical fevers it is of vital consequence to employ it seasonably. Ranald Martin writes, "What was a saving means at the commencement of the paroxysm, is as surely destructive at the end of it." In minor degrees of sthenic delirium leeching the head may be sufficient; Graves and Corrigan speak very favorably of its effects. The application of cold to the head is also a means of prime importance. Southwood Smith adduces cases to show that where headache and delirium are present, and the lancet is inadmissible, placing the patient in a warm bath, and directing a forcible stream of very cold water on his head, soon renders him more calm, relieves his headache, and for the time dissipates the cerebral symptoms. Graves adds his testimony that the effects of this remedy are extremely remarkable, and thinks that many of the cases in which he has employed tartar emetic with such signal advantage would derive equal benefit from this mode of treatment. Von der Decken and Brand[1] have lately found baths and cold affusions of eminent service in typhus, especially in tranquillising the brain and preventing delirium. Abercrombie prefers the cold stream to the application of pounded ice, but warns us that it is a remedy of such power that it requires to be used with discretion lest it produce excessive prostration. It is most probable that the *modus operandi* of the cold douche to the head consists in its exciting in the cutaneous nerves an impression which is propagated through the centre to the vaso-motor nerves of the cerebral arteries, and induces their contraction. On the same principle, viz. of inducing anæmia, a stream of water has long been used in some countries as a means of sending children to sleep.[2] Tartar emetic combined with opium has already been mentioned as a powerful remedy in violent cerebral excitement. Graves by no means proposed it as a specific to be given in all conditions; he does not advocate its use at the commencement of fever, when other antiphlogistic measures may be more advisable, but at a later period, when symptoms of general debility announcing the typhoid type begin to predominate; and when the condition of the patient approximates to that observed in certain varieties of delirium tremens. Graves lays down that the relative portions of tartar emetic and laudanum must be varied according to circumstances. "When congestion of the brain is known to exist, or is feared, the tartar emetic must not fall short of four grains in the eight ounces, while the laudanum should not exceed half a drachm; but when nervous symptoms predominate the laudanum may amount to ʒj, and the tartar emetic to gr. ij; no general rule, however, can be laid down, and the practitioner must in all cases watch the effect of this medicine from hour to hour until he ascertains whether it agrees with the patient or not" ('Clin. Med.,' p. 168). It is clear from Graves's cases that he considered the existence of very marked debility no contra-indication to the treatment. He states that it has sometimes disappointed him, but makes no mention of any disastrous effects produced by it. We have heard from those who have employed this remedy that such are by no means impossible. It was not for mere nervous disorder that Graves used tartar emetic and opium, but for nervous disorder combined with cerebral congestion. Wine, musk, porter, and opiates would control the nervous symptoms alone, but not when they were blended with the effects of cerebral hyperæmia. In some of the cases, but by no means in all, the pulse before the tartar emetic was given was small and wiry as well as frequent. The action of the medication was always to reduce the frequency of the pulse and render it fuller, and in some cases much softer. It is unfortunate that we have no information as to the quality of the first sound of the heart in the cases which Graves relates. One cannot but entertain much apprehension that tartar emetic would be a perilous drug to exhibit when the heart's tissue was seriously softened and enfeebled. Ackermann[1] always observed after injection of tartarised antimony a diminution of the force of the blood in the aorta, which took place whether the frequency of the pulse increased or diminished, but was greatest with a slow pulse. In dogs killed by tartar emetic the irritability of the heart, examined immediately after death, was remarkably diminished, and sometimes altogether extinguished. On the whole, the safest conclusion that one can arrive at with regard to this medication, seems to be that it is chiefly appropriate to conditions characterised by high nervous excitement associated with more or less active cerebral hyperæmia.

---

[1] Schmidt's 'Jahrb.,' vol. cxvii, p. 125.

[2] Graves's 'Clin. Med.,' p. 745.

---

[1] Virchow's 'Archiv.'—'Brit. Med. Journ.,' Aug. 29, 1863,

Some important general inferences may be drawn from the remarkable facts ascertained by Graves. (1) That in certain morbidly excited conditions of vital power depressing remedies are well borne, and may be essential to preserve life. (2) That this morbid excitation may be confined to one organ, as the brain. (3) That tartar emetic operates as a tissue sedative, and when it acts most favorably confines its sedative action to the morbidly excited organ. The case alluded to (p. 158) illustrates forcibly the last two propositions; the brain was violently excited, but the heart was far from being so or any of the other organs; the antimony produced no depressing effect, but seemed to expend itself on the brain. This is what it has been found to do, when it has acted most beneficially in pneumonia, but this is just what it is often at the present day impossible to ensure. The testimony of Trousseau to the varying tolerance of antimony at different epochs is very strong. At one time he found that patients could not bear tartar emetic at all, and he had to abandon its use, at another they were able to take gr. xv in the day (vol. i, p. 744).

Colchicum is a remedy which has been found of admirable effect in calming high delirium of the sthenic character associated with cerebral hyperæmia. Dr. Hamilton Roe gives gr. v of the powder every two or three hours until the face is blanched, and the morbid action quieted. In some visible inflammatory affections of the eye it acts similarly. It is a remedy of the same kind as tartar emetic, and to be used with the same precautions.

Hydrocyanic acid has lately been strongly recommended by Dr. M'Leod[1] as a powerful calmative in acute maniacal conditions where no grave structural change exists, and where the morbid action has not become, as it were, stereotyped by frequent recurrence. He considers that it checks the morbid activity of the brain, "the excessive and purposeless cerebral vigour." Sound sleep sometimes follows, but it is by no means a necessary result of its beneficial action. The dose is ♏v every quarter of an hour till some manifest effect is produced. If there is any difficulty in administering it by the mouth, the method of subcutaneous injection may be employed. In the latter case the ♏v of acid are to be combined with ♏xxx of water. M'Leod has no doubt, from his experience, that it has the power of promptly staying cases running on to chronic insanity on the one hand, or exhaustion and death on the other. As its best ascertained therapeutic effects consist in removing various neuralgic affections, it is probable that it is more appropriate to states of the brain in which simple excitement of the tissue constitutes the disorder, than to those of which hyperæmia forms an essential element. It is a depressing remedy like the two preceding, and I should not like to give it freely unless I was satisfied that my patient had a fairly vigorous heart.

---

[1] 'Med. Times and Gaz.,' March 14, 21, 1863.

The foregoing remarks relate to the treatment of sthenic delirium, but we have seen that acute or active delirium may be asthenic. It may be no easy matter to distinguish between cases requiring depressant measures, and those for which stimulating are essential. If we read Graves's remarks on the subject of giving wine and opium in fever, we cannot but remark that he felt it not uncommonly to be a difficult question to decide when they were to be given, and when withheld. He states, "that we must rely, in the more advanced stages of fever, on the tact acquired by previous experience and reflection, and must often depend more upon a correct estimate of the general state of the patient than upon the appearance or absence of any particular symptom."[1] Sleeplessness with restlessness and irritability, the patient constantly endeavouring to leave his bed, and having delusions,—these symptoms may urgently demand wine and opium. Violent and continuous delirium forbids, in Graves's opinion, a stimulating treatment, but this does not hold if, though there be a good deal of raving, it is nocturnal. Stokes gives a case (p. 404)[2] where there was violent delirium throughout the night (two days later it is simply reported that there was such delirium without specifying that it was nocturnal), in which sixteen ounces of wine daily with camphor, musk, and opium appeared to be highly beneficial. In one of Dr. Todd's cases of erysipelas,[3] the patient had such violent delirium, and created so much disturbance, that he was obliged to be placed in a separate ward. With ℥ss of brandy every two hours, and ♏xx of laudanum every four hours, the delirium was unabated, but diminished considerably and soon ceased after the brandy had been given every hour, and the laudanum had been replaced by bark, chloric ether, and ammonia. In another case, one of epileptic disorder, very violent and constant delirium, subsided in about four days under ℥ss of brandy every hour, with carbonate of ammonia and laudanum every four hours. The pulse steadily declined in frequency during the administration of the stimuli. Todd speaks very confidently also of the efficacy of alcohol in preventing delirium in patients suffering under various acute diseases. He evidently holds that it is better to err on the side of giving too much than too little stimulus. The points to which we should have most regard in endeavouring to determine the quality of the delirium we have to deal with are—(1) The general condition and constitution of the patient; (2) The state of the urinary secretion; (3) The state of the pulse; (4) The quality of the first sound and impulse of the heart; (5) The state of the pupil; (6) The state of the skin; (7) That of the bowels; (8) That of the temperature. If the patient be enfeebled from any cause, and has not previous to his illness enjoyed vigorous health; if his urine is in good quantity, not highly acid, red, or of high specific gravity; if the pulse is easily compressed; if the first sound of the heart and its impulse are weak; if the pupil is dilated, the skin not very hot and dry, and the bowels relaxed, we have good grounds for expecting that stimulants will be beneficial. A high temperature (above 104°) will usually coincide with a need of stimulus. In proportion as the above signs are less marked, the indications become less clear, and we must resort to what is often a wise proceeding, viz. testing the condition of the system with some remedies, the result of which may lead us to take the right course. The more we can perceive the signs of excitement without power in the cerebral disturbance, the more bold we may be in our administration of stimulants and support. In cases of this kind opium is often necessary, and its dose must depend on the degree of excitement, and on various other circumstances. Too small doses may only aggravate the excitement, and too large may bring on dangerous or fatal stupor. The determination of this point is one of the most delicate in therapeutics, and cannot be solved, at least in all instances, by administering small tentative doses in succession. I am much inclined myself to give bromide of potassium freely in cases where it might not be safe to give a full dose of opium. If we prefer the latter, the amount of cerebral excitement is the chief measure we have of the quantity of the drug which will be requisite to calm it. If the pupil be contracted belladonna may be given as an hypnotic with advantage, as Dr. Murchison tells us. Hyoscyamus would probably be suitable in the same state. In cases of the kind we are now considering, brandy mixed with milk will be found one of the best forms for administering stimulus and food. It should be given of course at very short intervals, say ʒij of brandy + ℥ss or ʒvj of milk every hour or half hour. Further directions as to the diet and management of delirious patients will be found in the paragraph on puerperal delirium.

---

[1] 'Clinical Med.,' p. 187.

[2] 'Dis. of the Heart and Aorta.'

[3] 'Clinical Lect. on Acute Diseases.'

CHAPTER X.

DELIRIUM TREMENS.

THE name has been pronounced on high authority a good enough name, and I presume it is likely to be retained in common use. Waiving all description of the symptoms, the first topic for consideration appears to be whether the disorder is invariably the result of alcoholic excess. Of course if we include in our definition of the malady a specification of its most ordinary cause, the question is settled. But if we act in the same way as we do with regard to most other *παθηματα, e.g.*, pneumonia, pleurisy, epilepsy, chorea, we must admit the vital phenomena and the post-mortem finding as the essential constituents of our definitions, and allow that in the case before us, as in many others, different causes may produce the same effect. Even if we admit, however, that true delirium tremens is almost always of alcoholic origin, it seems a matter of considerable significance that conditions closely resembling, if not identical with, it as regards its vital phenomena, proceed from causes of an entirely different kind. Let us look at some of these. Sir Thomas Watson states that long-continued mental anxiety, that state of mind in which gamblers and great speculators are accustomed to live, may cause it; anything by which the mind is overwrought. Dr. J. Johnson mentions having seen delirium tremens in young ladies whose mental powers had been exhausted by over application. The case is narrated of a stoker of good character, serving on board H.M.S. "Reynard," who fell, apparently in consequence of excitement at the murder of two of his shipmates by the Japanese, into a state of perfect delirium tremens, not one symptom being absent. It was proved that he had not been indulging in any alcoholic excess. Fox records a case to the same effect, the disorder supervening on exposure to cold and wet. He is positive that no indulgence in intoxicating liquors had anything to do with its production. Dr. Monckton relates the case of a female, æt. 28, who, rather more than three months after her confinement, presented an almost typical state of traumatic delirium tremens; "the breast abscess consummating the overthrow of brain equilibrium," for which previous and successive mental shocks had prepared the way. Gooch states that puerperal mania is sometimes strikingly similar to the disorders we are considering. Continued fever and influenza produce occasionally phenomena closely resembling those of delirium tremens. Graves writes with regard to the former:—"In short, can any greater resemblance exist between two diseases arising from the operation of remote causes so different?" ("Clin. Med.,' p. 156.) Traumatic delirium, closely copying alcoholic, may occur in persons who are not intemperate. The conclusion to which the above statements lead is sufficiently evident.

The inference which I am inclined to draw from these facts and others to be mentioned is, that, even in alcoholic delirium tremens, the morbid state of the nerve-tissue is much more important than that of the blood, and though occasioned directly or indirectly by the alcohol, is by no means a mere toxæmia, but rather a kind of diathesis. This view is confirmed by the fact that patients in states of great debility take for many days together, with most decided benefit, an amount of alcohol which would surely be injurious to them in their usual health. Though by no means fond of lavish stimulation, I have thought it necessary to give a man slowly recovering from fever with a greatly weakened heart from 20 to 28 ounces of brandy daily for fourteen days, besides smaller quantities before and after. Not the least intoxicating effect was produced, and the appetite and general condition improved considerably while he was taking this large amount of alcohol. I once ordered for a child, æt. 1½, who was miserably emaciated and cachetic, ʒiv of rum daily. By mistake ℥iv was written down, and to my utter astonishment the urchin took it all and throve upon it. I did not find out the mistake for a few days, and then, seeing that decided improvement was taking place, I let well alone. In cases of this kind the alcohol does not act as a poison, because the nerve-tissue, owing to the debility, is not injuriously stimulated by it, is not over-excited. Neither, again, does alcohol act poisonously in cases where, though it is constantly taken in excess, so that the blood must be more or less charged with it, the nervous and other tissues are maintained in vigorous life by healthy habits. Such a case as the following is not very rare. A very handsome, well-made Scotchman, after returning home from the tropics, spent the remainder of his life in the following way. Every evening for fifty years he regularly got drunk on whisky, but he spent much of the day in the open air. As a specimen of his activity, it may be mentioned that when he was about ninety years old he walked one morning fifteen miles across country before breakfast with his gun and dogs. I cannot think that in cases of this kind the usual explanation that the free exposure to fresh air procured elimination of the alcohol is valid, for the dose was taken at night, and produced its toxic effect, which then no doubt was slept off. The outdoor life sustained the vitality of the nervous centres, which would otherwise have been prostrated by the daily excesses, the influence of which must have extended over at least twelve hours of each day. The acute disorder termed by some delirium ebrietatis is much more a toxæmia than true delirium tremens, which often sets in without any unusual excess. The topic we have been discussing seems to me of great practical interest. If we believe the cerebral disorder to result from the presence of alcohol in the blood, we must consistently look to elimination of the poison as the chief means to recovery. But if we regard the phenomena as indicating disorder of nervous function in consequence of long-continued previous unhealthy irritation, our object must clearly be different. We have not merely to remove a materies morbi from the blood, but to restore an injured vital power—a task far more difficult. Closely connected with the preceding question is that relative to the disorder being ever produced by enforced abstinence from accustomed stimulus. Those who hold that it is essentially a specific toxæmia from alcoholic excess, deny that such abstinence is to be regarded as a cause at all, and assert that in all instances where this has been apparently the case, the paroxysm has only been accelerated in its arrival by the accident or disorder which has interfered with the usual indulgence. They insist that many persons cease from alcoholic excess and become sober without suffering in any degree from this malady. The records of prisons are appealed to in proof of this point. There is much truth in this statement, and I cannot doubt that many persons may at once be deprived of their habitual stimulus without more disorder to their nervous system ensuing than is implied by sensations of sinking, or craving, and distress, which subside after a few days. But I do greatly doubt whether this holds true of all the intemperate. Dr. Marston ('Edin. Med. Journ.,' October 19th, 1860) adduces evidence which very materially corroborates the older view, and renders it probable that the modern has been made too much of. He shows that delirium tremens does come on in soldiers commonly from the first to the seventh day after the privation of liquor, and this in men who had not suffered from it before. He argues, I think, convincingly and conformably to the analogy of other similar agents, that the nervous system becomes habituated to the constant use of alcoholic stimulus, so that although more or less injured by it, it feels seriously the deprivation. Probably most of us have some familiar experience of a similar kind. Thus, men who have been accustomed to take wine or beer moderately, have tried to leave them off for some reason or other, but found their efficiency for work so much impaired thereby that they were obliged to resume their usual allowance. Though for the above reasons I am unable to adopt the modern view exclusively, I quite believe that it may often be unnecessary and undesirable to administer any stimuli, and that in this matter we must simply have regard to the exigencies of the individual case, and deal with it as we would with any other.

The next topic is one of very great practical interest, and demands for its satisfactory elucidation all the evidence that we can obtain from different independent sources. The question is how far the malady is a self-limiting one, running, like a fever, a fated course, and terminating spontaneously at the end of a given time. It was affirmed by Dr. Ware that the delirium usually terminates favorably and spontaneously "at a period seldom less than sixty, or more than seventy hours from the commencement of the paroxysm." Dr. Laycock, who distinguishes the disease from the delirium, the latter being preceded by an initiatory stage of one or two days, gives a duration to the whole malady of from four to fourteen days, and finds the average of his cases to equal six days. Dr. Aitken writes—"The duration of the paroxysm varies from three, four, or seven days, and a favorable or fatal termination may be looked for in from three to five days. Dr. Laycock, contrasting the effects of an expectant and rational method of treatment as pursued by him with those which ensue when opium and stimulants are freely administered, tells us that he has had sixty-eight cases of varying degrees of severity, with only two deaths. Dr. Gairdner's experience at Edinburgh was one death only among thirty cases treated in an extremely simple and natural manner, the fatal case being complicated with a very extensive double pneumonia. Dr. Anstie in his able article in 'Reynold's Syst. of Med.,' gives testimony to the same effect. Similar views seem to have gained footing on the Continent. Trousseau writes, "The crisis is vehement, but relatively short, rarely fatal. After many therapeutic trials, which have succeeded too often not to awake some mistrust (as to their real efficacy), many physicians have ended by confining themselves, save in exceptional cases, to expectancy." ('Clin. Med.,' vol. ii, p. 302.) These statements certainly deserve the gravest consideration. They lead naturally to the conclusion, adopted by one most worthy inquirer, that the successful treatment of delirium tremens, in nine cases out of ten, depends on the regular supply of suitable nutriment, conjoined, of course, with sufficient surveillance and nursing of the patient. I entertain no doubt that such a procedure gives very much better results than any rude routine medication, and the knowledge which we have that such is the case, almost forbids any measures which are confessedly dangerous, unless employed by skilled and experienced hands. Theoretically, perhaps, careful nursing and feeding with a cholagogue purgative, or emetic, followed by a *little* opium, or some mild tonic, might be the best course to pursue in the great majority of instances. But it is not an easy one, in fact very much the reverse, and must often, I fear, prove impracticable. In one large hospital the governors have excluded cases of delirium tremens on account of the expense and trouble they occasioned. When the head of a family is attacked it is not altogether a light matter to interfere with his liberty, however needful it may appear. Keepers (for it generally comes to that) are reluctantly admitted into a house; and few drunkards can command the willing services of relays of friends during several days. Another important consideration which we must face is this:—Is there no danger that the patient will rave himself to death, that, remaining delirious and sleepless for several days and nights, he may sink from exhaustion? This is certainly no imaginary peril; I am sure that, together with continuous restless delirium, the vital power runs down in some instances with fearful rapidity. What Dr. Grattan says of the fever patient is often applicable, I think, to the subject of delirium tremens, viz., that two or three nights spent in restless delirium are followed by the worst consequences; and that patients who pass three nights in succession in that way almost invariably die. Sir Thomas Watson approves this statement, and expressly notices the resemblance between the two disorders. To the above considerations we must add the fact that there is a large body of testimony in favour of the arrest of the disorder by various remedies; and though we are told that these supposed instances of cure are only casual coincidences, the disease happening to terminate spontaneously shortly after the drug was administered, I fear that unphilosophic human nature, in its exigencies, will be much tempted to hope and try for a recurrence of such good fortune. The tendency, however, of the malady to terminate favorably without aid from drugs, should be always borne in mind, and make us see to it heedfully that we never push them to an injurious extent, lest the remedy prove worse than the disease.

Another very practically important question now presents itself, viz.—Is the disorder produced by alcohol always of the same quality, so that our experience of it may be a reliable guide in dealing with others? There is no doubt this question must be answered in the negative. Though the essential cause be the same, the phenomena may be different, varying from the typical form of acute melancholia to the much rarer of acute mania (Laycock). Not only so, but even when the symptoms are apparently alike, the vital condition of the patient, and his susceptibility towards remedies, may differ greatly. In one patient a fatty heart may render all depressants wholly inadmissible. In one the condition of the brain may be that of active determination of blood, in another the reverse, in a third, the effusion of serous fluid may be imminent at an early period.. The congested state of the liver and bowels may have much to do with the persistence of the delirium in one case, in another they may be fairly healthy. Our predecessors have recognised and stated all this plainly. Copland describes one species of the disease as "being evidently connected with inflammatory irritation of the arachnoid, and associated with great irritability," and another as "consisting chiefly of this last state, attended with exhausted nervous energy." He adds, however, immediately, and this seems very important, "yet it often presents intermediate forms or modifications, which cannot be referred to the one species more than the other." He insists that the treatment should be modified according to the type which the disorder most affects. Graves, though not separating his cases so widely from the etiological point of view as Blake and others have, lays down most positively the necessity for very different treatment in different cases. In the young and robust the disease may demand strictly antiphlogistic measures, including venæsection, leeching, and cold to the head; while in the old, debilitated, and confirmed drunkard, "we are often obliged to exhibit opium from the very commencement, and that in large doses combined with stimulants." Between these extremes, he proceeds, there are many intermediate varieties, each requiring a special modification of practice (v. 'Clin. Med.,' p. 155). Dr. Marston, in his excellent paper ('Edin. Med. Jour.,' 1860, Oct.), distinguishes three separate and distinct forms of delirium tremens—1st. D. ebrietatis, an acute debauch, with intervals of sobriety. 2nd. D. ebriosorum, a delirium of drunkards in contradistinction to a delirium from drink. 3rd. D. complicated with visceral disease, renal, hepatic, gastro-enteric, cardiac, central. He says:—"That if any one plan of treatment be pursued in all, and if without reference to their distinctive features they be individually and severally heaped together under one head, we can obtain no reliable data. Not a little misconception it seems to me has arisen from this very source." He suspects "that by far the larger number of the so-called statistics consists of individual cases of the first form, and if so the generalisation from them cannot fail to be vitiated when applied to the whole disease." The analogy of rheumatic and of other kinds of delirium tends materially to confirm the opinion that alcoholic delirium is not a constant and uniform process.

In the matter of Prognosis I am inclined to look upon the occurrence of epileptoid attacks as of bad omen. Three out of four cases I have notes of in which these took place died, and the fourth patient nearly perished in the fit. They seem to imply a graver kind of nerve disorder than delirium alone. Long abstinence from proper food, a senile appearance not warranted by the patient's age, signs of fatty degeneration of the heart, wild delirium impatient of any restraint, pneumonia, or any similar complication, add materially to the gravity of the situation. *Cæteris paribus*, I should think worse of any case in which the urine not containing bile turned black, or of a very dark colour when heated with one third its volume of nitric acid. This sign has no special reference to alcoholic disease, but may be noted in any where the nervous power is greatly depressed. The phosphates have often been stated, on the authority of Dr. Bence Jones, to be very deficient in the urine, but he specially mentions that this is the case only when no food is taken. His analyses were not made on the whole urine of twenty-four hours, and therefore do not affirm anything positive as to the total amount. In one case I found the total amount of phosphoric acid passed just as convalescence was commencing 67·16 grains, the urine having a sp. gr. of 1023, and its twenty-four hours' quantity 46 ounces. Two days later the twenty-four hours' quantity was 48 ounces, sp. gr. 1012, total phosphoric acid, 28·36 grains. The first urine was notably albuminous, the second not at all so.

The next topic is Treatment. We have already seen that no uniform fixed plan can be pursued, that the remedies must be varied according to the condition of the individual patient. The great object is to calm the cerebral excitement, and I quite believe that in many instances this is possible, and that we need not resign ourselves to expectancy, but no little tact and discernment are often requisite.

The first thing to be done in all cases is to look to the state of the intestinal canal and its glands, which very often needs to be corrected. Dr. Copland says:—"Of all the cases of the disease I have seen there has not been one that has not indicated the propriety of prescribing cathartics, in order to remove accumulated secretions. From the quantity of very dark, offensive, bilious evacuations which they have procured,—often not until after their repeated exhibition, and even in cases where the bowels had been opened or relaxed,—I have concluded that collections of vitiated bile in the gall-bladder and hepatic ducts have favoured the supervention" of this disorder. In a case recorded in my 'Lumleian Lectures,' symptoms very much resembling those of delirium tremens were found to depend on an unhealthy state of the liver and bowels, the patient being quite temperate. The importance of attending to this indication before administering any opium is obvious; this useful drug might be rendered noxious simply by the neglect of this precaution.

If the action of the heart is good and steady, its sounds normal, the pulse of fair force, its tracing not of the brief, jerky, "typhoid" character, noted by Dr. Anstie, if there is no undue relaxation of the bowels, nor copious perspiration, depressants may be employed with little fear of evil and much expectation of good. Antimony, ipecacuanha, and the cold douche to the head, are the most ordinary and efficient means of this class. Dr. Peddie seems to have been more happy in his experience of antimony than almost any one else. He treated eighty cases of delirium tremens with uniform success by tartar emetic in doses of gr. $\frac{1}{4}$—$\frac{1}{2}$ in simple solution every two hours, or at shorter intervals, according to the degree of excitement and irritability. He considers that the state of the brain is one of alcoholic erethism, the tendency of which is to pass from irritation, with abnormal activity of circulation, to inflammatory action, according to the severity of the attack and other circumstances. The action of the antimony appears to be chiefly sedative. Its direct influence is to reduce the vascular excitement of the brain, soothe the nervous system, and diminish muscular power, and its more indirect action is exerted on the skin, kidneys, and intestinal canal. In this I quite agree with him, and have not the least doubt that its action on the nervous system is quite independent of any derivation it may produce elsewhere. In fact, I believe it acts best as a cerebral sedative when no other effect whatever is apparent. Graves says that tartar emetic boldly exhibited is often our sheet-anchor in delirium tremens, especially when there is evidently active determination of blood to the head. In many, perhaps in most cases, it is well to combine it with a little opium if only for the purpose of guarding the bowels, and the quantity may be increased if signs of nervous excitement predominate over those of active hyperæmia. No general rule, however, as Graves says, can be laid down, "*and the practitioner must in all cases watch the effects of this medicine from hour to hour,* until he ascertains whether it agrees with the patient or not. Where a life is at stake we must spare no pains, and must not reject a remedy because its powers render it an instrument of good or evil, according as it is administered carefully or otherwise." ('Clin. Med.,' p. 168.)

Dr. Morehead notices determination of blood to the capillaries of the brain as a common occurrence in Europeans in India, and says that such cerebral hyperæmia is present in by far the larger proportion of cases of delirium tremens met with in European hospitals in India. On this account tartar emetic and cold affusion are so valuable, and the free use of opium and stimulants so dangerous in its treatment. He recognises the two species of the disease which we have before noticed, and divides the second into two stages—one of depression, a second of active delirium, and a third of low delirium and coma in fatal cases, or of prolonged sleep in those terminating in recovery. In all the stages of the second species he advises the use of stimulants if circumstances seem to call for them, as well as of opium in the second, though mostly in combination with tartar emetic (thus gr. ½—i with ♏xx vel xxx tr. opii, *o. h.*

vel 2da vel 3tia). The second stage he thinks has a natural tendency to terminate after a certain time (twenty-four to sixty hours).

Dr. Anstie states that in some cases tartar emetic has produced most unfortunate results, and mentions that death has resulted in his knowledge from so little as two or three consecutive gr. ¼ doses given on account of a pneumonic complication. With due attention to the state of the first sound of the heart and to the pulse, and to the general condition of the system, and careful observation of the effect produced by the few first doses of the remedy, we need not, I think, be over-timid in its use. Dr. Russell tells us that in an epidemic of typhus in Glasgow, 1863-64, "Graves' combination of tartar emetic and opium in many cases soothed most violent delirium, and indeed acted like a charm." ('Glasgow Med. Jour.,' July, 1864.) In this disease the circulation is notoriously enfeebled, the pulse is described as "thready, almost imperceptible, and very rapid," yet, nevertheless, the drug had the good effects above mentioned. Why should it not act similarly in delirium tremens? It is a good plan in doubtful cases to give a little brandy with each dose of the antimonial; by this means we may obtain its sedative effect on the nervous system, while we obviate its depressing on the heart. Ipecacuanha is a similar agent, and to be used with like precautions; it is less liable to cause perilous depression, but also less efficient in severe cases than antimony. Sometimes, however, its full emetic operation may tranquillise more than repeated doses of antimony. The cold douche to the shaven scalp, either alone or combined with the warm bath, is a means of recognised utility which ought to be more employed than it is. Dr. Bucknill's remarks on its employment are very instructive. He has known a single application for one hour of the warm bath with cold to the head effect the best part of the cure in a maniacal patient; and in many instances of recent mania with hot head, full pulse, and violent delirium, he has seen the symptoms take a favorable turn from the first application of this powerful remedy. But it is not a remedy free from danger, one patient died after being in the bath only twenty minutes, and others have manifested a decided tendency to syncope. Its effects, however, can be carefully watched, and regulated more easily than those of any internal medicine can be, and I should think there are few cases presenting any indications of cerebral hyperæmia in which this means might not be safely and beneficially employed for a longer or shorter time. How long must be left to the judgment of the practitioner in each individual case. He can watch the pulse, and desist the moment he thinks that sufficient effect has been produced. Five or ten minutes may suffice for some patients, forty or fifty may not be too much for others. Where it is not desirable to use the cold douche the warm bath alone, at a temperature of 90° or 95°, continued for about half an hour, may assist materially in tranquillising the patient, as Dr. Copland states, and enable sedatives to act with more efficacy. Dr. Bucknill mentions a case of mania in which ℥ss of tr. hyoscy. produced little or no sleep alone, but with the aid of a warm bath afforded eight or nine hours of sound sleep.

A very important paper on the nature and treatment of the disease we are studying, has been published by Dr. M'Crea, of Victoria, Australia. His opportunities have been very large, and he has used them well. During eleven years ending December, 1867, no fewer than 898 cases of various degrees of intensity, from the milder ones in which the delirium lasted only one night, to the most severe, came under his observation. The mortality during the whole eleven years was 30 cases, or 3·34 of the numbers treated, but this mortality was by no means uniform. It varied considerably under different modes of treatment. For the first three years the old method of giving opium was adopted. The stomach and bowels were emptied by an emetic and purgative, and opium was given in doses varying from ♏20-60 every six hours till sleep was procured. Under this system of treatment the mortality was 9·6 per cent. of the cases treated.

During the year 1861-62, half-ounce doses of tincture of digitalis were given in 57 cases, the number of doses varying from 1 to 10, according to the duration of the disease. In a little less than half the cases the effect of the medicine seemed to be beneficial, in a little more than half the cases the effect was either doubtful or null. The mortality was 8·7 per cent. During the five years ending December, 1864 (with the exception of the cases treated by digitalis), the disease was treated by an emetic and purgative at once, the cold douche to the head, and blue pill in alterative doses with tr. ferri muriatis. The douche was a powerful one, and was given for five or six minutes two or three times a day. The effects of this remedy were always good, and in very many cases the benefit was very remarkable. The mortality attending this last method by the cold douche was 4·6 per cent. of the cases treated. In December, 1864, Dr. M'Crea says that his attention was forcibly drawn to the uniformity of the appearances presented on dissection, which was always performed in fatal cases. In all such there were signs of very great congestion of the brain and its membranes, and effusion of an abnormal quantity of fluid in the ventricles and about the medulla oblongata, often in the spinal column. Very often, especially in those who had suffered previous attacks, there were opacity of the arachnoid, and signs of inflammation in it and in the pia mater. I began to think that the causes of delirium tremens had been misunderstood, and that congestion and inflammation of the membranes of the brain were the true causes of the disease. Acting on this idea, I began to use leeches in the aggravated cases, applying twelve under each ear; the effect was very striking and beneficial, the excitement being greatly reduced, and very often sleep following very rapidly the application of the leeches. In some cases an aggravation of symptoms came on, and again twenty-four leeches were applied with corresponding benefit. In one case a third application of twenty-four was necessary, and had the effect of permanently controlling the disease. For the last three years, '65-'67, all the patients have been subjected to one uniform treatment, consisting of an emetic, cold affusion on the head, purgative if need be, quiet, cold water or tea, cold cloths to the head. This for the first evening and night. In the morning, should the disease show no signs of yielding, twenty-four leeches are applied at once. During the course of the day cold affusion is repeated at intervals of six hours, and if the bowels do not act a purgative is given. If the symptoms are aggravated towards night, and the delirium becomes more violent, the leeches are repeated; but unless this is the case they are deferred till the next day, when, if there has been no sleep, nor sign of the disease yielding, they are again applied; and sometimes a third application is necessary. The absence of any great amount of debility, after the use of a large number of leeches, is remarkable, and contrasts favorably with the condition of seven cases which had been previously treated without leeching. The result of this practice is very striking, the mortality for the three years mentioned being only 1·1 per cent., and for the first seven months of 1868 it has been 0. Dr. M'Crea justly lays stress on the application of leeches, in such cases as require them, not being delayed beyond twenty-four hours from the commencement of the attack. He also enforces an entire absence of stimulants ('Med. Times and Gaz.,' 1868, December 19).

The above record of Dr. M'Crea's experience is very valuable, and shows clearly that with the constitutions he has to do with, depressing measures may be of great efficacy. When we meet with the same we shall do well to act in the same way, but we must remember that with too many of our population mutton is a much rarer luxury than it is in Australia, and they are consequently less fitted to bear depletion.

We have next to consider the use of sedatives, of which opium is 'facile princeps.' This drug, like every good thing, has been abused, and the consequence is that some are inclined to forbear its employment altogether. This seems to me unnecessary, and therefore undesirable. If, indeed, there was only a choice between laudanum and whisky administered "coup sur coup" till sleep came or death on the one hand, and renunciation of these on the other, better the latter, no doubt. But I believe, with Dr. G. Johnson, that opium properly given is often "highly successful," though I am well aware that it also often fails. After a cholagogue purge a tolerably full dose should be given, and if this proves insufficient to tranquillise completely, but does not contract the pupils or otherwise evidently disagree, it may be repeated in two to four hours. If there be any suspicion that the patient is still under the influence of liquor, the opiate should not be given, as its action may then be delayed some hours. Along with the opium, good beef tea, or strong soups well flavoured should always be given, and repeated every three or four hours, even during sleep if there is much prostration. Not unfrequently the opium, though given largely, produces no sedative effect at all, but the reverse, the patient becoming more excited after each dose. I have known seventeen grains to be taken in the course of one night with no other result, most of it by far in the fluid form. Under such circumstances the drug must be at once withdrawn, the brain is evidently too hyperæsthetic to tolerate an agent which there is much reason for regarding as primarily a stimulant. If the condition of the patient appears to warrant it, we may now resort to depressants, after the operation of which we may find the system, which was before refractory, obedient to a moderate narcotic dose. If, on the other hand, these agents are forbidden by evident signs of asthenia, we may administer suitable stimulants freely, among which I think bottled stout may generally find a place, while as medicines carbonate of ammonia in cascarilla infusion, or quinine, and camphor in pills containing three or four grains, every four or six hours may be advised. Believing, as I do, that true delirium tremens is no mere alcoholic toxæmia, I cannot but join with Dr. Marston and Dr. G. Johnson in recommending the administration of stimulants in cases where they appear requisite. The latter physician, who cannot be suspected of blind adhesion to authority, states that he "has seen not a few cases of delirium tremens in which, after repeated large doses of opium had failed to procure sleep, a liberal allowance of the patient's accustomed stimulant, more especially when combined with food, has been followed by a long sleep, and this by an entire freedom from delusions and delirium" ('Lancet,' 1868, vol. i, p. 450). If these are mere coincidences they are certainly happy ones, and it may at least be said that the results justify the practice in these instances. Dr. Johnson has done well in drawing attention to another ill effect which may result from the incautious administration of opium in large doses. This is its paralysing influence on the heart, the cerebrum meanwhile remaining exempt. The first clear statement of this risk was given, I believe, by Dr. Russell ('Brit. Med. Journ.,' 1860, May 5), but it had been mentioned before by Trousseau. Dr. Bucknill has perhaps given the fullest account of this unfortunate tendency (*vide* 'Psychol. Med.,' p. 524). He tells us that on the occasion of an outbreak of dysentery in a damp ward occupied by idiots and demented patients, the rather free use of opium was advised by a physician who was consulted. "The effect of the drug on three demented patients was most remarkable. The opium took no effect upon the cerebrum proper, but exerted the most depressing influence upon the excito-motory apparatus. The respiratory movements became more and more slow, the temperature of the body decreased, the pulse failed, and the patients sank with the general symptoms of narcotisation from opium minus any influence upon the mental functions. There was no coma or stupidity, the patients being fully awake to the last." Some who were not so much affected were recovered by stimulants. Much the same thing has occurred occasionally in the treatment of delirium tremens. While dose after dose of opium is given the patient continues his incessant raving or struggling until suddenly syncope occurs, and he is soon dead. Dr. G. Johnson describes the asthenia as coming on more gradually, the patient remaining conscious grows rapidly weaker, the pulse becomes small, quick, and feeble, the pupils are contracted, the skin is bathed in sweat, and so he sinks. I have seen death occur in this way in delirium tremens, but it was when so little opium had been given, and that so long previously, that the asthenia could not possibly have been produced by it. Patients suffering from delirium tremens are certainly prone to die more or less suddenly in the way of asthenia, and I by no means think the fatal result is often fairly attributable to the treatment. The exhaustion produced by restless struggling acting on a more or less degenerated heart is quite sufficient to account for it. I have had my attention directed to this subject for a long time, but I have not been able to see it in as clear a light as I could wish. On the one hand the evidence that opium may so act as to paralyse the heart is of the highest kind. On the other we have the facts that opium may be given in large quantities in morbid states, tending to death by asthenia, as peritonitis, burns, and neuralgic pain, not only with safety but great advantage. Laudanum in free doses is advised by Sir T. Watson in perilous depression of the heart's action from drinking cold water when exhausted. For the present it must suffice to have noticed this risk of cardiac paralysis as an additional reason for not administering opium in any lavish manner. There is, however, yet a point to be noticed respecting the use of opium which is of practical moment, viz. that repeated small doses have not the same effect as a single large. The former are apt to increase excitement, the latter quells it. The following case is a good illustration:—A strong male, of middle age, habitually intemperate, had drunk hard up to the time of attack. He was seen by Dr. Hamilton Roe about forty-eight hours after delirium had commenced, and had been treated previously with small doses of opium ineffectually. His pulse when seen was full and quick, skin rather hot, head hot, eyes and face red and flushed, delirium rather fierce. Three grains of opium were given at first, but had only the effect of causing further excitement. Two hours after, six grains were given, which quieted, but did not sleep him; and three hours later he took six more, slept almost immediately, and woke, after six or eight hours, quite rational, and recovered. No stimulants were given. It seems to me that it would be quite unfair to object that in this case the opium was not the cause of the sleep which would have come on spontaneously without. Fifteen grains of opium in five hours is no placebo, and beyond all question had not the nervous system been in such a state of erethism as to tolerate and, in a measure, to resist it, the dose would have proved fatal. The administration of opium in such full doses requires a master's discrimination, and I am by no means inclined to advocate a frequent recourse to such practice. It is probably most appropriate to cases where there is great cerebral hyperæsthesia and excitement, without much active hyperæmia, and where the circulation is too weak to render the use of depressants advisable. Other sedatives may occasionally serve our turn when opium disagrees. Dr. Anstie has seen *Indian hemp* produce excellent effects. I have found large doses of henbane apparently useful, and they are certainly safer than corresponding quantities of opium, but on the whole we cannot expect much aid from it in cases of difficulty. *Bromide of potassium* has been used, it is said, with most beneficial results, in doses of gr. xx repeated every few hours. I have recently given it in 30 grain doses *2dis horis* in a case of well marked active delirium evidently dependent on previous intemperate habits with excellent effects. Sleep was induced the first night, and the delirium was at an end in 3 or 4 days. *Chloroform inhalation* cannot be pronounced a safe remedy, though we do not know in how much greater a proportion of cases of delirium tremens it causes death than in cases taken indifferently. No doubt it is more dangerous in the former on account of the frequent existence of more or less fatty degeneration of the heart, and I think it should not be had recourse to except in peculiar cases. If the malady resist depressants and sedatives, and there seems too much probability that the continued raving and struggling will issue in fatal exhaustion, while the patient's age and history permit us to hope that his heart is yet tolerably sound, chloroform should be cautiously employed. There is the risk certainly that the patient may die during its administration, and the friends should be warned of this. If, however, the practitioner sees that exhaustion is increasing, in spite of food and stimulants, the remedy should not be too long delayed. Probably the safest way of procedure is that employed by Mr. Ellis, who causes the patient to inhale the vapours of alcohol, ether, and chloroform, mingled in varying proportions (*vide* 'Lancet,' 1866, vol. i, pp. 144, 509). The alcohol, by its stimulating effects, counteracts the tendency of the chloroform to enfeeble the action of the heart.

The next remedy which claims our attention is *Digitalis*. This, it may seem to many, should have been placed among the depressants. While not doubting that it may be so used, I am sure that in states of profound asthenia it often produces the contrary effect, acting as a cardiac tonic; and it is this result which is, I think, mainly to be aimed at when it is given in delirium tremens. The cases to which it is appropriate are those where, with more or less cerebral hyperæsthesia, there is marked feebleness of the circulation. What is wanted is to find some means which shall invigorate the latter without increasing the irritation of the brain. Digitalis is, perhaps, more likely to accomplish this than any other tonic; but in two cases mentioned by Dr. Mackenzie it had the effect of changing a state of timidity into the fury of acute mania, and in one I observed myself (large doses being given) it acted similarly. In the method employed by Mr. Jones, of Jersey, half an ounce is given at first, and the same quantity four hours later, with two drachms more after three hours. It does not appear that the drug need always be given in precisely the same way; in some successful cases two drachms have been given about every three hours; one patient took twenty-eight drachms in thirty-three hours. Alienist physicians speak favorably of the remedy, but given in much smaller doses—ʒss twice or thrice in the day or oftener. It is recommended by Dr. Robertson in the second stage of general paresis, attended with maniacal excitement "as quite specific." It calms the excitement, steadies the pulse, and enables the patient to pass without wear or irritation through this stage of the malady. Mr. G. M. Jones's experience, however, does not countenance the use of small doses as ʒss—ʒi in delirium tremens. They do, he says, no good whatever; and the pulse in some cases where they were tried became intermitting. The larger doses, on the contrary, so far from lowering the pulse, render it fuller, stronger, and more regular. The cold, clammy perspirations pass off, and the skin becomes warmer. There is a considerable amount of testimony in favour of the employment of Tr. digitalis in large doses; but there is also some weighty opposed to it. Dr. G. Johnson considers it very dangerous, having heard of several instances of sudden death where it has been had recourse to. Dr. Anstie thinks that the question of the utility of this procedure is in a very unsatisfactory position, and is not satisfied that the benefit obtained in many instances did not result from the proof spirit, and not from the drug it dissolved. I cannot doubt myself that the treatment has often proved of essential service—the case recorded by Mr. Jones as an example, and his success in obtaining the recovery of sixty-six cases out of sixty-seven (the fatal one having a tumour in the brain) suffice to prove this. But I am not so clear as I should like to be as to its safety, and am inclined to place it for the present on nearly the same footing as chloroform, to be had recourse to in peculiar cases where the evident peril of the condition justifies our incurring a certain amount of risk. In ordinary cases, where nursing and feeding will bring our patient through, we are not warranted in running any risk, at least (which is not always easy) if we can ensure our charge being properly cared for. It is to be remembered that suicidal tendency is not unfrequent in the subjects of delirium tremens; and this creates another danger against which he needs protection. Thus, if a patient had attempted to destroy himself, and could not be easily restrained, and was bringing himself into danger of sudden death by struggling with his attendants or in the strait-waistcoat, I might think it wisest to try to calm him by means which, in more favorable instances, I should avoid.

A remedy has lately been announced by Drs. Kinnear and Ferneley ('Lancet,' 1862, March 8th, 15th) as very successful, which is safer, perhaps, than several of those we have reviewed. It has also received the approval of Dr. Lyons ('Med. Press and Circular,' April 18th, 1866, and 'B. M. J.,' 1868, November 7th). He gave his patient a bolus containing thirty grains of Cayenne pepper. This caused some slight burning in the mouth and throat for a time, but no serious inconvenience; and in less than an hour the patient fell into a sound sleep, from which he arose three or four hours later in a state of convalescence. Lyons believes that the remedy must operate by a direct influence on the gastric expansions of the vagi, and through them on the cerebro-spinal centres. He thinks it especially appropriate to those cases which are characterised by relapses and senile decay. Kinnear recommends ʒss of powdered capsicum to be given every four hours until sleep supervenes. Three doses is the average required, but occasionally seven have been given. Each is administered in a small quantity of gin. Care must be taken that the bowels are freely open. The patient generally sleeps five hours, and wakes composed and refreshed, without any nervous symptoms. In many cases one dose has been sufficient. During the last six months of 1861 eighty cases of this disease were treated at the Melville Hospital, Chatham. The average number of days in hospital of uncomplicated delirium tremens has been a little over five. In only three has gastric irritation been observed, in all of which obstinate constipation existed; and laxative medicine removed all unfavorable symptoms.

I have not had myself an opportunity of trying Dr. Chapman's icebag in this disease, but it is favorably reported of by Dr. Hewitt and Mr. Hamilton in Dublin (*vide* 'Med. Circular,' 1868, vol. ii). They agree that it induces sleep, diminishes and removes tremors, regulates vascular action, and causes a rise in temperature with return of the natural colour to the face. Dr. Hewitt states that the most suitable cases for its use are those in which there is profuse sweating, pallor of countenance, much tremor, and continued wakefulness. I believe it is a remedy which may render good service, and is not open to the objections which may be urged against several others.

Quinine and *strychnia* are remedies which should not be left out of count. In asthenic cases, and in those where the stomach is especially failing, the latter especially might prove a friend in need. The former would be suitable to cases marked by a very weak pulse and copious sweating.

The following case is a good instance of rather acute delirium, the result of hæmorrhage, and of the danger it induces.

Case 1.—W. N—, æt. 63, wheelwright, admitted September 2, 1869. Health generally fair; has suffered from rheumatism, not from indigestion. Could always have ate more if he could have got it. Yesterday he had much pain at epigastrium, which set in at 3 a.m., and some diarrhœa occurred. About 1 p.m. to-day he vomited a large quantity of blood, and passed much also per anum. The epigastric pain is gone now. When the hæmatemesis took place he lost sight, but not consciousness. He was very blanched by the hæmorrhage. The stools on 3rd were black; he was taking lead and opium. On 7th the abdominal aorta was throbbing strongly about the umbilicus; there was no murmur; the pulse was good, the hand warm. Delirium commenced the next day, and continued more or less until the 18th, when the excitement yielded almost entirely to pot. bromid. gr. 30 2 *dis horis*. For some days it was so considerable that he could not be kept in bed without pretty constant watching. His temperature on three several occasions was about 99°; his pulse varied from 82 to 117, and was of good force apparently. He remained tranquil, but sank about 10 a.m. of 20th. Some diarrhœa occurred, but no more hæmorrhage. The urine was pale, acid, non-albuminous. Up to the 11th he had simple diet, milk, and beef-tea; after that date broth diet containing meat, two eggs, or a chop. Brandy, three ounces, was ordered on 6th, and on 11th the quantity was increased to six ounces; he had also porter after 13th. At the autopsy a small ulcer, no larger than a split-pea, was found in the lesser curvature of the stomach, about two inches from the pylorus; no other existed either in the stomach or duodenum. The liver and spleen were normal; the kidneys fairly healthy. The heart was healthy. The lungs were posteriorly in a state of hypostatic pneumonia. The abdominal aorta was healthy. The brain was very pale, rather wet, weighed nearly forty-eight ounces; its structure was quite natural, but numerous bubbles of gas were seen under the arachnoid at the anterior part of the hemispheres. The blood showed (after death) no increase of white corpuscles.

There can be no doubt that this man died from the exhaustion occasioned by the long delirium. He was, indeed, seriously drained by the hæmorrhage; but I have seen patients recover well who were as much, if not more, anæmic than him. Besides, his circulation and temperature were well sustained; there was no syncope. The diagnosis of gastric ulcer led me to keep him on low diet at first, but for the last nine days of his life, *i. e.* as soon as the cerebral disorder threatened peril, he was fairly well fed and stimulated. It did not appear that the man had been at all intemperate. The case illustrates well how delirium may take its origin in simple anæmia, which, as usual, tends to generate hyperæsthesia or some other nerve disorder; and then how this cerebral hyperæsthesia may run on into fatal asthenia. The small size of the ulcer which wrought the mischief is remarkable.

CHAPTER XI.

HEAT-STROKE.

That the human frame is capable of enduring very great heat is well known, not only for a short period, as in Blagden's experiments, but for many days and weeks. At the siege of Delhi, as Sir R. Martin states, officers were exposed all day to the sun of June, July, and August, and yet preserved their health under a temperature of 130° or more to a wonderful extent. But though such high temperatures may be endured by many, there is no question that excessive heat is often a very messenger of death. In New York the mortality from this cause is very remarkable. In August, 1853, 224 persons died from sunstroke; in 1863 there were 135 deaths from the same cause; in 1866 there were 230; and in the present year, up to July 18th, there were no less than the prodigious number of 833. An extract from a New York paper for (I believe) 1866, states that a week of extremely hot weather, the thermometer in the shade marking 110°·5, and in the sun 125°, proved more fatal to human life than any pestilence that ever visited that city. There were 940 deaths during five days, a daily average increase of 128 over ordinary times. This terrible mortality, exceeding that of our worst cholera season, is directly traceable to the intense solar heat that prevailed during the time mentioned. The victims were principally children, nevertheless there were 60 fatal cases of sunstroke in one day. In Philadelphia the deaths from sunstroke in 1868 were during 5 consecutive weeks, ending Aug. 1st, 0, 11, 50, 40, 1, the total mortality varying from 287 to 555 per week (*v.* 'Pennsylv. Hosp. Rec.,' 1869). The above statements suggest the probability that the effects of heat do not depend solely on the degree of temperature, but also on other modifying circumstances which may vary in different places. There is no doubt also that the more or less resisting power of individuals has much to do with the result. The term "heat-stroke" is specially justified, not only by the sudden occurrence of prostration and insensibility in many cases, but by the fact that some sufferers feel as if they had actually received a blow at the back of the neck or head. It is preferable to insolation as it is quite certain that exposure to the sun's rays is by no means necessary.

We will first take the more severe cases, and afterwards those of less gravity. Dr. Maclean approves the classification adopted by Dr. Morehead, who divides insolation into three varieties, the cardiac, the cerebro-spinal, and the mixed. "In the cardiac variety, although it is probable that the sufferer is himself conscious of some premonitory symptoms, there is seldom time for their full development so as to attract the attention of the bystanders before the patient falls, gasps, and in some severe cases expires before there is time to do much, or anything, for his recovery, death taking place by syncope." This form is most frequently seen in men who are exerting themselves in the heat of the sun while in full dress with their accoutrements. Sir R. Martin speaks of powerful native officers and troopers falling from their horses during a forced march of forty miles under a most fierce sun, vomiting, convulsed, cold, and covered with profuse clammy sweat, in fact, in a state of more or less completely syncope. In the cerebro-spinal cases, premonitory symptoms generally give notice of the coming danger. These are heat and extreme dryness of the skin, giddiness, congestion of the eyes, extreme debility, nausea, and frequent desire to micturate. The heat is said to be remarkably ardent and stinging, and raises the thermometer sometimes as high as 107°. Sometimes delirium is one of the earliest symptoms, the patients starting up evidently much alarmed, staggering along, and struggling violently when laid hold of, or uttering wild shouts of laughter, or becoming incoherent in their talk, threatening and quite maniacal. French soldiers in these circumstances have often committed suicide. After a longer or shorter continuance of the above symptoms the patient becomes insensible; the heat and dryness of the skin augment; the respiration becomes hurried, noisy, laboured; the pupils contract and are quite insensible to light; the eyes become more congested; the heart's action tumultuous; the pulse, sooner or later, feeble and irregular; and death takes place by coma, with or without convulsions. When convulsions exist they may occur at an early or late period.

In the mixed form the symptoms of both varieties are blended, and death occurs partly by coma, partly by asthenia. A great majority of the favorable cases, it is stated by Sir R. Martin, occurring during a march, belong to this mixed condition.

The heat of the blood is no doubt in all cases increased, though this point does not seem to have been extensively examined as yet. Dr. Baümler has recently recorded a very interesting case of heat-stroke, occurring in London during June, 1866, in which the temperature in the axilla was 109°·2 soon after the seizure. Ice was applied freely all over the surface, and the patient placed in a tepid bath at 80° for a short time. The temperature gradually declined, and about two hours before death was only 102°·4. In some cases treated by Dr. Levick, at Philadelphia, the temperature was also very high, in two amounting to 109°. It is worth remarking that in Dr. Baümler's case there were frequent loose evacuations from the bowels, consisting of a light yellow fluid with flakes like coagulated albumen.

The results of *post-mortem* examination so far as we are acquainted with them, seem to be tolerably constant. The blood is invariably fluid, that is to say, has lost its power of coagulating; and as this depends on the fibrine, we must regard this constituent as in some way deficient or gravely altered. The lungs are prone to be extremely congested, sometimes quite black and presenting the appearance of pulmonary apoplexy; occasionally the congestion has advanced to actual extravasation, the bronchial tubes being filled with frothy serous blood. The brain and its membranes are sometimes also extremely congested, but less constantly and less intensely than the lungs. Sir R. Martin considers that the more or less rapid course of each case modifies the *post-mortem* results. Where death takes place rapidly in the way of syncope, there are found but slight traces of disease within the cerebral cavity, but intense pulmonary engorgement is present, ending sometimes in pulmonary apoplexy; while in cases of slower progress we find the vessels of the dura mater gorged almost to bursting, and more or less congestion of the brain itself, with copious and extensive serous effusion on its surface and within its ventricles. I subjoin the record of a fatal case which occurred at St. George's Hospital during 1868.

CASE 1.—A man, æt. 60, was seized, some time in the afternoon of July 16th, with a fit which cannot be accurately described. He fell down, became unconscious, and was admitted in a moribund condition, with a small, very rapid pulse. He died soon after. Post-mortem nineteen hours after death. Body much decomposed. Brain intensely congested and of a pinkish hue throughout. The puncta vasculosa were greatly increased in number, and around the larger ones there was a distinct halo of discoloration, due to the soaking of the blood through the walls of the vessels. The ventricles contained a quantity of deeply-tinged bloody fluid. The substance was of firm consistence, and the central parts were not broken down. The lungs were very much congested, especially the lower parts, where they had the appearance of pulmonary apoplexy, except that the congestion was not in circumscribed patches, but uniformly diffused. The heart was uncontracted and empty, its structure was fatty and rotten, and the valves blood-stained. The blood was universally fluid. The liver was natural. The spleen soft and full of blood. The kidneys were congested and the tubes full ('Lancet,' 1868, July 25).

Congestion of the lungs is one of the most striking and frequent phenomena revealed by dissection, but it is not constant. Out of forty-seven cases tabulated by Mr. Marcus Hill, there are eight in which it is stated that the thoracic viscera were healthy, except extensive adhesions in several. In another there was only partial hepatization of the left lung, and in some others the congestion does not seem to have been at all excessive. In one case the right lung was healthy, but the left was excessively gorged with blood. In several instances there was either bloody fluid in the pleural cavity or ecchymosis, or diffused extravasation beneath the pulmonary pleura. The right cavities of the heart were not invariably distended. Most probably in all where the lungs appeared tolerably healthy there was nothing unusual in their condition. In some it is said that the heart was empty and natural. The evidence that the brain may be congested as well as the lungs seems to me decisive; there is the same description of gorged vessels and of blood-stained effusion in not a few instances.

Before quitting this part of my subject, I will record another case which, by its contrast with the preceding, may serve to put us on our guard against the error to which we are too liable, of laying undue stress on palpable alterations compared with those which are not so evident to our senses.

Case 2.—A. D—, boy, æt. 8, was admitted into St. Mary's Hospital on July 30th, 1868. His mother states that on the 29th he had been out all day in the sun without a hat, and without having any food. In the evening, when he came home, he was convulsed, and fell down insensible. These convulsions occurred during the night, and when brought in he was quite insensible, with deep stertorous breathing; pulse at 62. The next day (31st), at 11.30 a.m., he lay quite unconscious; pulse 78, jerky and thready; pupils rather dilated, contracting on application of light; breathing stertorous; skin of head hot; respirations 25 per minute. During the night he had several convulsions, and about this time (when the notes were taken) he had another fit lasting two minutes; the mouth was drawn to the right side, the right eye turned inwards, the pupils widely dilated, the hand and leg drawn upwards. Temp. in axilla, 100°. Post-mortem one day after death. Body well nourished. Some froth and mucus escaping from the nose. A little fluid in both pleuræ. Adhesions, partly of recent formation, existed on both sides. Lungs were bright red, and in some parts appeared congested, but were everywhere crepitant, except a few lobules which were unexpanded. In the lower lobes of both were many bright red patches, and some quite pale. They were often arranged so that a red patch of one eighth or one fourth of an inch diameter was surrounded by a pale anæmic zone; these patches did not correspond with the lobules. There were a few spots of extravasation which appeared to be capillary. Bronchi filled with purulent mucus, their lining membrane highly vascular. Microscopic examination of lungs showed no inflammatory cells or other products except in the bronchi. Heart contracted; both sides contained blood; the right side was not remarkably full. The blood was particularly apt to stain, its coagulation was very imperfect. There were soft black, but no white clots; some bubbles were seen in the right ventricle. On microscopic examination many small white masses were seen, just large enough to be visible to the naked eye; these appeared to be clots containing a great number of colourless corpuscles. Liver and kidneys perfectly healthy. Spleen small and hard, its Malpighian corpuscles were very evident. Brain anæmic and dry, its sinuses very empty, not many puncta vasculosa.

The symptoms during life in this boy, and the mode of his death, were closely similar to those observed in the case at St. George's, but the post-mortem phenomena were very different. The lungs in the former were but slightly congested, the brain absolutely pale, and the heart well contracted, without any notable accumulation of blood on either side. In the elderly man all this was reversed; the only point of resemblance is the uncoagulated state of the blood, and its tendency to allow the colouring matter to escape from the red cells. It seems plain that some less visible alteration must have existed which was common to the two cases.

It may be mentioned here that meningitis is occasionally the result of exposure to the sun, even when the head is covered. I have seen one such case myself, and another occurred a year or two ago at St. Bartholomew's.

I proceed to cite some cases of minor severity, which, nevertheless, appear to me of very great value, and capable of indicating to us the true pathology of the malady perhaps even more clearly than those where the events are more numerous, more complex, and on a larger scale. A well-known physician related to me once his personal experience of sun-stroke. It did not affect him notably in any other way except that he slept almost continuously for forty-eight hours. He suffered, in fact, a moderate coma. Dr. Strange, in a highly interesting paper in the 'British Medical Journal,' 1868, August 29th, relates the following case:—A stonemason, a strong, muscular man, working at a short distance from the hospital one hot day early in the season, was brought in in a state of partial collapse, the result of sudden sun-stroke while at work. He stated that he had suffered from the heat for the previous two or three days. Having recovered from his collapse, he exhibited the next day the following symptoms, viz.—considerable dulness of apprehension, loss of memory, hesitation of speech, with defective sensation and motion over the whole of the body. The skin was cool, and had been so all along; the pulse slow and small; there were sleeplessness and anorexia. With cold shower-bath, aperients, nourishing diet, and afterwards quinine, he slowly improved, but was unable to leave the hospital on account of the defective sensory and motor power of the limbs. He was Faradised, and after three months was discharged pretty well. In a second case, the patient, a slim youth of 18, after exposure to a broiling sun, suffered collapse. In the evening he had vomiting, smart fever, rigors, with preceding pain in head, and hot skin. The next day the vomiting continued, the thirst was excessive, he had pain down the spine and in all the muscles, and at night delirium, which continued to recur, and was exceedingly violent on the fourth night. A tendency to syncope was occasionally present. With ice to the head and internally, tepid sponging of the surface, and beef-tea with brandy every three hours, the patient became rapidly convalescent. In a third case, a man, æt. 48, energetic and muscular, after much exposure to the heat, suffered with weariness, pain in back of head or down spine, inability to sleep after 2 a.m., and great and causeless anxiety. He was speedily cured by bromide of potassium. Dr. Buller ('British Medical Journal,' August 22nd, 1868) relates the case of a lady æt. 30 (about), strong, and unused to illness, who, while walking in the street on a very hot day, was suddenly seized with pain in the head, giddiness, faintness, and a sensation as if she should die. She looked so ill when seen as she was returning home, that she was with difficulty recognised. For nearly fourteen days she remained very ill, suffering with sleeplessness, disturbed nights, anxious fearful days, with occasional aggravated attacks of pain in the top of the head, which was hot, confused vision, vertigo, sickness, loss of power in her limbs, palpitation of the heart, and irregular quick pulse, with a sensation of coldness of the body, and often a distressing anxiety as if she were going to die. Quiet, cold to the head, aperients, and bromide of potassium were serviceable; and, subsequently, much seems to have been effected by a combination of small doses of calomel, tartar emetic, and muriate of morphia given repeatedly. In a case at present under my care in St. Mary's Hospital, the prominent symptom of the first seizure which the patient had in England (he had had one previously in Japan) was loss of sight, which lasted a few minutes. In a third attack he became unconscious, as he did in his first.

Dr. Palmer has favoured me with the following history of a case under his care:

Case 3.—Mrs. S—, æt. 34 (about), widow, had suffered a slight attack of sun-stroke in India about eight years before. On June 13th, a very hot day indeed, after driving out in an open carriage, when she felt the sun very much, was seized within three or four hours with severe headache, giddiness, faintness, nausea, languor, chilliness, and actual rigors. When seen two hours later the face and neck were scarlet, and the conjunctivæ injected; she complained of intensely severe headache, felt most across the forehead and along the superior longitudinal sinus, of intolerance of light, and much pain of back and loins. Her surface was then dry and hot to the touch, but she felt cold internally. She was anxious and alarmed, her tongue quite clean, her pulse very little disturbed. Cold was applied to the head, warmth to the feet, free ventilation enjoined, and an ammonia diaphoretic prescribed. The following day she complained of having a cold, her throat was sore inwardly, and swollen a little externally. Purgatives were of much benefit, and she was convalescent in about a week. The same day (the closest and most oppressive that had yet occurred) she walked out for an hour in the morning, and drove out soon after, the sun at that time not shining strongly. At 2 p.m. she felt low and tired; at 6 p.m. was found by Dr. Palmer in just such a state as before—feet cold, shivering strongly, yawning, feeling sick, with intense headache, the right eye bloodshot, the face and neck scarlet, a rash just like that of scarlatina on chest, pulse oppressed, skin hot, but not actually dry. In a few hours reaction set in; the pulse was 100, small and weak; she was restless and anxious. The next day she had vomited several times, the cutaneous hyperæmia had nearly or quite gone. The subsequent symptoms were obstruction of the *right* nostril as by a cold, redness of the *right* eyelids, and severe pain of the *right* side of the face. The quantity of mucus secreted by the right nostril was extraordinary, such as she had never before had in her life; it lasted several days.

I am indebted to Mr. Hickman for the following history of a case which came under his immediate observation.

Case 4.—The gentleman, æt. about 35, was sitting reading by the window, in the month of May, with his head exposed to the sun. He felt the heat much, but although feeling very uncomfortable he did not quit his seat immediately. All at once he was seized with a sudden violent pain shooting through his head from one side to the other. It was so severe and unexpected that he was compelled to jump up and cry out; but it was gone in a moment, leaving merely a heavy, full sensation behind, which gradually diminished while he kept quiet and in the shade. By the afternoon he had quite forgotten the occurrence, till he was again reminded of it by a seizure as sudden and violent as that of the morning, which came on while he was out walking, and pulled him up in his walk as if he had been shot. From this time for some weeks not a day passed without his having these attacks, sometimes only two or three, at others as many as eight or ten in the day, coming on at all times, and under every variety of circumstances, and in spite of every care in avoiding exposure to the sun, the slightest degree of which was sufficient to cause the sense of fulness and of weight in the head. Occasionally, also, there was severe general headache, coming on towards evening, but usually quite gone in the morning. After a few weeks the attacks became gradually less severe and less frequent, and at length appeared to have ceased, but after a long drive in an open carriage much exposed to a hot sun, he was again seized with the sudden acute pain in the head. This continued to recur several times a day, was followed by headache, and finally settled down into a constant headache, aggravated by passing through any sunshine, and by reading or any occupation requiring a concentrated attention, and was accompanied by general debility and by much nervous irritability. Some relief was obtained at first by gentle purgatives, and by bathing the head with cold water, but latterly the bathing seemed to increase the headache. A fortnight at the seaside brought great relief to all the symptoms, which were, however, brought on again by the hot and long railway journey when returning; and permanent relief was only obtained after the cool weather set in.

Summing up the phenomena observed in these cases of English heat-stroke, we find that they have reference to the intellectual nervous centres, and those of motion and sensation; to those presiding over the heart and the stomach, and to the vaso-motor centres. Symptoms of the disorder of the hemispheres are stupor, dulness of apprehension, loss of memory, vertigo, unconsciousness, sleeplessness, anxiety, delirium, alarm, nervous irritability, and severe headache. Intolerance of light and confused vision or blindness announce the implication of the optic lobes. The participation of the cord, with its developments into the large basal ganglia of the encephalon, in the disorder, is shown by the rigors, the pain down the spine and in the back and loins, by the persistent motor and sensory semi-paralysis occasionally noticed. The collapse, faintness, and dying sensation imply an affection of the cardiac ganglia; while the unilateral hyperæmia of the eye and nostril, and the generally diffused hyperæmia of the face and neck, point clearly to paralysis of vaso motor centres or nerves. It is probable that the nerves of the intracranial arteries were affected much in the same way in some instances as those of the face and neck were in the last case, and this may have been to some extent concerned in producing the delirium and headache.

The sequelæ to heat-stroke may be briefly but correctly described as ardent fevers with acute delirium, remittent and intermittent fevers complicated with various visceral congestions, or quasi-inflammations constituting the earlier epiphenomena; and a perfect multitude of dysæsthesiæ and other nervous derangements constituting the later. In both it is still the same story that we have already had so copiously illustrated, viz., primary predominant disorder of the nervous system; the sympathetic centres, however, being more involved in the one, the cerebro-spinal in the other. By Sir R. Martin's kindness I have been enabled to see and examine for myself several sufferers from sun-stroke in India, and can quite confirm his statements in the general relative to the multiform and extraordinarily various disorders with which these patients are afflicted. Some suffer with cerebral debility, incapacitating them from attention to any business, some become actually demented, others epileptic, others quasi-hysterical; some have deafness or impaired vision, some local palsies, some itching or a peculiar eruption. These statements are taken from Sir R. Martin's work. He has favoured me with the notes of a case which deserves record as a curious example of (as I regard it) a vaso motor spasmodic neurosis. Major —— has suffered two seizures during the hot weather under direct solar exposure, almost amounting to insensibility. The first was in 1850, and the effects soon passed off. The second was in 1851, and was more severe, being followed by fever. During four years from this last illness uneasy feelings in the right arm and swelling of the hand of that side occurred at noon of every day at all seasons, and eventually the liver became enlarged, accompanied by some loss of power over the right arm. In April, 1866, he was first seen in London, when impaired power of the right arm had become more marked, with the old puffiness of the right hand in the night. Together with internal remedies, the chlorine bath was ordered three times a week, and soon a decided improvement was apparent in his general condition, as well as in his local symptoms. But it was observed that while he was in the bath (he took twenty-four) the right side of the forehead and face, the right hand, and the fore part of that arm, remained perfectly dry, whilst all other parts were running down with perspiration. However long he remained in the bath the skin of these parts continued dry and harsh as parchment. The limitation of the dryness by the median line was very apparent on the face. It appears to me that in this instance, owing to a morbid state of the afferent nerves of the dry districts, the stimulus of the chlorine vapour caused contraction of the minute arteries supplying the cutaneous glands, and so impeded their function. Just as an irritable state of the retina causes persistent contraction of the obicularis palpebrarum.

The persistency of these disorders is scarcely less than their multiformity, and it almost amounts to this, which is, perhaps, the gravest misfortune of all, that a man who has once received a severe *coup de soleil* is never again the same man that he was. His nervous system has undergone a peculiar enfeeblement, which makes it ever prone to lapse into some form or other of functional disorder, and renders it incapable of enduring any strain. Even in temperate climates, the original integrity of cerebral nutrition is not fully regained, and exposure to the injurious influences which induced the first attack are almost sure to reproduce the distressing symptoms with great severity. At the same time the character of the disorders, their often temporary occurrence, the juvantia, and the apparent recovery which may ensue under favorable circumstances, tend strongly to impress the physician's mind with the idea that the morbid phenomena are not dependent on any demonstrable structural lesion, but belong to the same group as neuralgia, epilepsy, and insanity.

I subjoin a record of the state of a patient who has been under my observation about two years, which affords a good example of the sequelæ of English heat-stroke.

Case 5.—Mr. W—, æt. 47, a strong-looking, well-made man, seen September 25, 1866. He never could bear heat well, but is braced and benefited by cold. His memory has failed somewhat the last three or four years, and his eyesight also. For more than three years he had been in close attendance on an invalid, and his nights' rest had been much interrupted. This ceased at the end of last October, and he remained pretty well up to the end of May. While at Seven Oaks he had an attack one hot day after he had been out in the heat a good deal. In this he did not lose consciousness, but sunk down on the ground, and recovered before long enough to walk twenty or thirty yards to his house. The left side was most affected, but the right leg also suffered. Since then no material change has taken place. At present the motor power of the left side is impaired to some extent, but he can grasp strongly. He cannot walk more than 200 yards, but this is more from giddiness than weakness. The sensory power of the left side is impaired; he feels as though he were walking on India-rubber balls, or as if his feet were in a poultice. This dysæsthesia is not constant, but is readily brought on by anything that excites him. At the posterior part of vertex of the head there is a tender spot, on tapping which he feels a jarring in the tips of his left fingers. After walking a little his head turns giddy; he feels, he says, like an imbecile; and there comes on a dull, dead feeling at the heart. He could bear very little noise or conversation at first, or any excitement. A short journey eight weeks ago tried his head excessively; "he thought he should have gone mad." Can only read for a few minutes at a time; the letters are apt to get confused, and his eyes ache. He is emotionally excitable; has fits of crying. His heart, lungs, and kidneys seem quite sound. Some possibility of syphilitic infection admitted. At the right side of vertex there is a depressed spot from which a piece of bone was taken out many years ago, but there is not the least tenderness there, and the morbid sensations which come on in the head do not start from this spot. Under a general tonic treatment he has mended considerably, but remains subject to great variations, sometimes feeling almost quite as well as ever, at others greatly depressed. His power of walking has greatly improved; some days he has been able to walk several miles, but he is obliged to be cautious in exposing himself to the sun. Relapses have frequently occurred, but they have been, on the whole, less severe, and he has recovered from them more quickly. The alterations in his condition have often been remarkable; sometimes, but not always, traceable to unusual strain or excitement; and it is curious (as observed both by himself and his wife) that the over-exertion does not tell on him immediately, but after three or four days. During the relapses he has sometimes perfectly unilateral left-side affection, a feeling as if he had no use of the limbs, or of any part of that side, or of the face. Sensations come on at the back of his head, which pass down his back into both hands, and give rise to the feeling as if there was dirt crammed under the finger nails, or as if his left foot was melting away. He does not know always when his feet are touching the ground. These sensations are almost indescribable, are attended with giddiness and inability to walk well, and great lowness of spirits, more or less insomnia, irritability of temper, and a degree, in fact, of mental derangement. Though he looks the very picture of health he is quite unmanned, timid, nervous, and incapable of applying himself to business. One of the evidences of improvement was his being able to shave himself, which he had been a long while unable to do. He could not bear the sight of a razor.

The diagnosis of heat-stroke, as the chief motor of the morbid process, is borne out by the mode of attack, the nature and variability of the symptoms, the effect of excitement and heat, and the juvantia. Had actual organic lesion existed, the symptoms, according to my experience, would have been much more constant, and deterioration would almost certainly have been the result under the treatment, and not improvement. Just as dyspnœa is most considerable when the lungs are sound, so cerebral disorders are more complex and manifold when the encephalon remains structurally intact,—a cause of disordered function existing in both cases. Patients in this state deserve sincere commiseration, quite as much, I believe, as any who are tortured by neuralgia. Their malady is very real, and admits of relief by means of physical agents judiciously managed, though on a superficial view one might be ready to class them with "*malades imaginaires.*"

Our next topic is Etiology. It might be thought that this admitted of no discussion, regard being had to the nomenclature; but we soon find that this is not the case. Mr. Marcus Hill argues with much plausibility against heat being the sole and essential cause of the malady, from the very numerous instances in which soldiers and labourers have been exposed to extreme heat, solar or artificial, without suffering in this way. As an instance he cites a passage from Dr. Henderson's report, which states that a body of sappers and soldiers marched seventy miles, from Candahar to Yeriskh, and back again, after a halt of seven days, enduring intense heat and great fatigue, without having one man struck down by *coup de soleil.* The thermometer during the march stood at 120°; at Candahar, in the shade, it varied from 100° to 109°. Dr. Maclean also remarks that British sportsmen in India often pursue their exciting amusement in the hottest weather, but by using reasonable precautions they seldom suffer. He is fully alive to the influence exerted by other concurrent conditions, but says "that it cannot be doubted that heat, and, speaking generally, heat long continued, is the true exciting cause of this formidable affection." This opinion we can scarcely hesitate to accept; nevertheless, we ought not to leave unnoticed the strong resemblance which seems to exist between the operation of heat and malaria, as this has strongly impressed more than one able observer. Mr. M. Hill writes:—"It seems to me, as I have attempted to show, that there is probably a very close connection between these attacks of heat-apoplexy and remittent fever, and there are, indeed, many good and substantive reasons for the assumption that it (heat-apoplexy) depends primarily upon a cause similar, if not identical, with that which excites remittent fever." Mr. Bonnyman, writing nine years later than Mr. Hill, expresses his belief that further investigation will probably show that malarious fevers and heat-apoplexy are due to the same or to closely allied causes. He regards *heat* as the essential cause of the latter (differing herein from Mr. Hill), but thinks that the same is also often productive of periodic fevers. The facts which have arrested the attention of these observers may probably be accounted for on these grounds. Heat generates malaria—as a rule, the more heat the more malaria—it cannot therefore surprise us that the two influences should be commonly in operation together. Even where the soil is thoroughly dry, at least on its surface, malaria may be abundantly generated by heat, so that there are few places of which one can positively affirm that the generation of malaria is impossible. Again, heat, while generating malaria, enables it to act at an advantage by enfeebling the resisting power of the body. Lastly, it seems scarcely doubtful that both these agents primarily affect the nervous system, and that in the same way, and operate on the other organs in great measure through its medium. Putting together these facts, it does not appear to me difficult to account for the views which I have above noticed.

The following history, cited by Dr. Maclean, may be referred to here as probably an illustration of the conjoined effects of heat and malaria.

On July 8th, 1853, a body of men, 1200 strong, marched from Bevarloo to Hasselt (about twelve miles). They started at 8 a.m. Only 500 reached Hasselt in the evening, nineteen perished *en route*, and a great number in a state of furious delirium were taken to hospital. It is a remarkable thing that the temperature on this occasion did not exceed 91° or 95°. Nothing so disastrous, Dr.

Maclean says, occurred under an Indian sun during the time of the mutiny. In connection with this, M. Boudin observes that two well-known Egyptian astronomers, MM. Mahmoud and Ismail, who were in Brussels on that day, assured M. Quetelet that they suffered as much from a temperature of 87°·2 in that city as from a temperature of nearly 122° in Cairo,—a fresh proof of the necessity of taking count of the quality of temperature (Reynolds's 'System of Medicine,' vol. ii, p. 160).

Over the other causes, whose influence however is often most important, we may pass more lightly. They are in general the predisposing causes of fevers and many other diseases. Fatigue, foul air, intemperance, unsuitable dress, have all in various well-known instances manifested their fatal influence. They bear the same relation to the special cause, heat, as they do to the special miasm of typhoid or typhus fever. Certain other conditions of a less definite kind seem to contribute materially to the destructive effects of heat. Calm, sultry, oppressive weather appears to be more pernicious than bright and clear, though perhaps somewhat hotter. The beneficial effect of a thunderstorm has been several times observed. In the 'Report of the American Army,' 1863, it is stated that cases of insolation were of very common occurrence during oppressively hot weather, the men being heavily laden with arms, ammunition, rations, &c., but a heavy thunderstorm swept across the face of the country, leaving behind it an invigorating coolness, which banished sunstroke from the ranks of the army for the rest of the season. Sir R. Martin alludes to the time when the strong south-west monsoon ceases; and the sky becomes obscured by a film of dark, heavy, negatively electrified clouds, and the atmosphere hangs like a weight on the mind and body of the soldier, as that which is most favorable to the occurrence of epileptic seizures in India, and I presume of heat-stroke also. At such times, says Dr. C. A. Gordon, not only do men become the subjects of the disease, but the lower animals are not unfrequently attacked, and die suddenly from it. ('Edin. Med. Jour.,' 1860, p. 987.) Dr. Ramsbotham has noticed the occurrence of puerperal convulsions more especially when a thunderstorm has been threatening.

The Pathology of this malady, if a single malady it is, is surely of exceeding interest. So much does it seem to link itself with many classical forms of morbid action, with various neuroses, fevers, and inflammatory congestions, that it is not too much to assert that if a full comprehension of the *modus operandi* of the morbid agents concerned in heat-stroke could be obtained, a flood of light would be shed over the whole field of acute disease. There are but two theories which seem to call for special notice. One is that advocated by M. Hill and Bonnyman, to the effect that the symptoms are the result of the poisonous action of retained CO_2, the elimination of which by the lungs is materially less in hot weather, while in heat-apoplexy not only do the other emunctories not make up by an increase in their functions for the deficient respiratory changes, but they themselves cease also in great measure to perform their depuratory offices. "When it is borne in mind how absolutely necessary for the welfare of the body, and even for the existence of life, the proper performance of the functions is, it cannot be matter of surprise that on the interruption of function of so many important organs as the lungs, kidneys, skin, and intestines, disease of a grave character should result." He dwells on the coincidence of the symptoms, as well as of the post-mortem appearances in slow poisoning by CO_2, with those met with in heat-apoplexy. I feel it difficult to give my assent to this view, except to a limited extent, for the following reasons:—If the accumulation of CO_2 in the blood were the cause of the pulmonary engorgement which is so often met with, the causal condition being supposed essential, the engorged state of the lungs ought to be constant too, which we have seen it is not. It must also be remarked that very commonly the elimination of CO_2 from the system must be most materially checked, as when one lung is compressed by effusion, or both are locked up in asthma; yet nothing like heat-stroke results. Slow poisoning by CO_2 does not seem capable of accounting for the event in such cases as Sir R. Martin mentions, where men riding in the open air fell off their horses vomiting, convulsed, cold, and covered with profuse clammy sweat; nor, indeed, for any of the cases which run an acute course, whether of the cerebral or cardiac variety. It does not seem easily explained how the arrest of the elimination of CO_2 from the lungs (supposing it the primary alteration) is brought about. If it is in consequence of the air being rarefied by the heat, this ought to affect all alike, and besides ought to be much more felt by those who ascend high mountains, or go up in balloons, who yet rarely, if ever, suffer as the heat-struck do. This argument seems to have the more weight because the elimination of CO_2 from the blood is essentially a physical process, not dependent on vito-chemical action, as is the case with most secretions.

While not accepting this theory as giving an adequate explanation of the primary morbid changes, I think it, nevertheless, contains a modicum of truth, and I cannot doubt that the presence of retained excreta in the blood must tend materially to lessen the resisting power to morbific agents, and to intensify their injurious influence. Blood-poisoning may well occupy a subordinate and secondary place, though I cannot assign it the first in pathologic precedency. The theory which seems to me most to accord with all the facts, and to explain them best, starts from the undoubted premises—(1), that heat, when it becomes at all excessive, is enfeebling to nerve-power; and (2), that persons endued with much nerve force resist heat much better than those more feebly constituted. As to the influence of heat upon the heart, it is notorious that it often proves paralysing. Syncope, even fatal, has not uncommonly been produced by the hot bath, and the Turkish also commonly affects novices to some extent in the same way. That the vaso-motor nerves and their centres are enfeebled and relaxed by heat cannot be questioned; it is a matter of the commonest experience. This seems to be true of the vaso-motor nerves of internal organs, as well as of the external. Were it otherwise, how should diarrhœa be so common a disorder in hot climates and in hot weather at the very time when blood is determined most freely to the cutaneous surface? That motor nerves and centres are commonly enfeebled by heat is surely proved by the great difference in our capability for bodily exertion on a cold and on a hot day. The very same I find true in my own case, as regards the intellectual centres. At a time when I have felt extremely brain-feeble, when study was almost impossible, except for a short time, the weather being mild and damp, a change to dry and cold has restored my vigour in a few hours. A man of much larger calibre tells us something to the same effect. Professor Tyndal, in his work on the 'Glaciers of the Alps,' says—"Whether my exercise be mental or bodily, I am always most vigorous when cool." Most of us, I think, during the recent heats must have been conscious of diminished capacity for any mental effort. Mr. M. Hill dwells on "the listlessness, lassitude, want of physical energy and of mental vigour, which so much trouble us in hot weather, and also the extraordinary tendency to somnolence, which exhibits itself so frequently in persons recently arrived in this country (India), and whose brains have been habituated to the stimulus of purer blood whilst resident in a colder climate." ('Indian Annals,' 1855, October, p. 221.) Such instances of failing power are, it is true, but miniature maladies, yet they seem to me well worth noting as marking the gradual transition from perfect health to actual disorder, and showing how, even in its lesser degrees, the operation of heat is depressing to the intellectual centres. It must be remarked that cerebral enfeeblement does not necessarily show itself in an approach to stupor, but often by an apparently opposite state, marked by restlessness, fidgetiness, and more or less insomnia. A further stage of this is delirium, just as a further degree of the former is coma. The two conditions of the brain are (as I have tried to show elsewhere) the exact analogues of the hyperæsthesia and numbness which are common disorders of sensory nerves, and occur under very much the same circumstances. As I have, in my Lumleian Lectures, argued that pain is a mode of paralysis of sensory nerves, it seems to me particularly interesting to find it present here in association with so many other pareses. Very much the same view as I take was propounded many years ago by Sir Thomas Watson. He remarks, in his lectures, that he conjectures the affection termed sunstroke is more akin to the state we call concussion than to true apoplexy. "It would appear," he proceeds, "that the sun's rays act upon the brain like a shock. The nervous system is suddenly and extensively influenced, and the heart's movements arrested as in syncope." The apparent suddenness of the seizure in many cases may be attributed, I believe, to the circumstance that the cause acts primarily and principally on the nervous system. It is notorious how often the derangements of this part of our vital machinery declare themselves by a sudden outbreak. In another part of this work I have offered some evidence to show that a paralysing shock, acting through vaso-motor nerves on the capillaries, may give rise to solution of their walls and extravasation. Beaupré's case is so appropriate to our present subject that I may be excused for repeating it here. The subject of it was a soldier, previously in perfect health, who was suddenly stricken down senseless by sunstroke, and died in six hours. During life, black, dissolved, scorbutic-like blood flowed from the nares; the cavity of the mouth was filled with blood, and all the lining membrane was chequered with livid, scorbutic-like spots. A litre and a half of black blood mixed with urine was drawn off by the catheter. On dissection, spots of extravasation were found throughout the whole extent of the mucous lining of the alimentary canal, as well as in that of the nasal fossæ and of the bladder. Something of this kind probably occurs in the pulmonary capillaries of those cases where the lungs are found in a state of intense congestion, with patches of partial or complete apoplexy, or with sub-pleural extravasation, or even in the pleural cavity. A less considerable but similar result of the relaxing effect of heat was noticed in a young male, whose perspiration in the axillæ stained his flannel red while he was exposed to tropical or semi-tropical heat. I have little doubt that blood-globules escaped from his capillaries, as they have been found by the microscope in "bloody sweat." It does not appear to me very difficult to understand why the lungs are so often found intensely congested if we consider that the blood is in a fluid state, and probably gravitates into the chest in large amount even after death; that the capillary network of the air-cells is extremely close; and, what is of particular moment, that the vessels are, unlike any others in the body, almost entirely unsupported by solid tissue; that their normal texture is more or less altered by the nervous shock; and that the mode of death in many, perhaps most instances, occurs in the way of coma. These considerations go far to account for the phenomena; but I will not affirm that they explain them completely. To do this, however, does not appear to me in anywise necessary to my theory, as the condition in question is by no means constant, and cannot therefore be regarded as essential. The cerebral hyperæmia, which is of very frequent occurrence, depends, I conceive, like the pulmonary, mainly on paralysis of the nerves of its afferent vessels. The increased temperature is a very important phenomenon which completely harmonises with the theory I advocate, and is not observed in intoxication by carbonic acid when the surface is universally cold and the pulse slow (G. Bird). Its dependence on the same cause that we believe to be operative in fever—viz. paralysis of the sympathetic system—can hardly be questioned, especially when we note the co-existence of sundry other signs of vasal paralysis, such as hyperæmias and effusions. I cannot conclude this part of my subject better than by the following quotation from a recent communication of Dr. H. Weber to the Clinical Society. His views appear to me well substantiated, and have a most interesting connection with the subject before us. The two cases on which his communication is founded are summarised as follows:

Case 6.—*Summary.*—Injury to the neck, with at first only transitory loss of consciousness; excessive micturition and diarrhœa; contraction of pupils; rapid rise of temperature, and development of intense pyrexia, with coma; death eight hours after injury, with a temperature of 111·2° F. (44° C.) *Post-mortem examination.*—Fracture and dislocation of third, fourth, and fifth cervical vertebræ; considerable laceration of the corresponding portion of the spinal marrow; softness and moistness of the brain; intense congestion of the lungs; fluidity of the blood in the diastolic heart; ecchymotic spots under pericardium and endocardium.

Case 7.—*Summary.*—Injury to the neck; at first no perfect loss of consciousness or of motion; afterwards coma, with development of intense pyrexia; death nineteen hours after the accident. *Post-mortem.*—Fracture and dislocation of the third and fourth cervical vertebræ; lesion of the corresponding portion of the spinal marrow; brain soft; intense congestion of the lungs; heart distended with fluid blood; minute ecchymotic patches on its surface. The fact taught by these cases, that the most intense pyrexia can be developed by lesion of certain portions of the nerve centres alone, without the previous existence of any morbid poison, or any other change in the blood, is in favour of the view that the phenomena of fever or pyrexia are referable to nerve influence, that they are in fact nerve symptoms, and that the blood changes inseparable from fever are, to a great degree, effected by an altered nerve action, even in those processes where the admixture of a poison to the blood is the first link in the chain of morbid conditions. The great analogy in the symptoms during life, and in the post-mortem appearances between these cases and cases of heat-stroke, as described by Longmore, Maclean, and others, and also the cases of rapid death from rheumatic fever and other diseases, accompanied by excessive ante-mortem rise of temperature, leads us to the inference that the vital condition of the nerve-centres is the same in all of them, and if it were allowed to use hypothetical expressions, we would designate this condition as paralysis of certain portions of the nerve-centres, and especially of the regulating centre, or centres of the chemical processes. The observations before us are already sufficient to show that this paralysis may be produced in various ways, as by exhaustion, owing to continued overstraining of the regulatory apparatuses of temperature in protracted exposure to high temperature under unfavorable circumstances (ordinary heat-stroke), or in acute diseases accompanied by high degrees of pyrexia, by pain, by sleeplessness, convulsions (acute rheumatism, tetanus, &c.), by mechanical injury to certain parts of the nerve-centres, as in the cases just related; and it is not improbable that severe shock to the nervous system alone, mechanical or physical, may, under peculiar circumstances, suffice to produce the same effect.

These interesting observations of Dr. Weber cannot fail to remind us that it has been found necessary, by experience, to protect the upper part of the spine from the heat as much as the head, and that in some cases of heat-stroke the sufferers have felt as if they had received a blow on this part. We also see that intense congestion of the lungs and ecchymotic spots are produced under the very conditions which I conceive to exist in heat-stroke; viz. prostration of nerve power and elevated temperature without any poison being present in the blood.

The great dryness of the skin is probably produced in the same way as in the hot stage of fever (however that may be); it is not of constant occurrence, and is met with in cases of long-continued exposure to heat where no serious malady has ever occurred, as in the Bengal pilots mentioned by Sir R. Martin, p. 47, and p. 392.

Were any further evidence necessary as to the essential concernment of the nervous system in heat-stroke, it would be found, I think, in consideration of the chronic sequelæ.

While I cannot but believe that the primary nerve disorder in heat-stroke is of a functional kind, and that all the grave symptoms which ensue may be independent of any structural lesion (at least any demonstrable), I am quite ready to admit that secondary effusion of serum or blood within the cranium, or obstruction of the pulmonary blood-vessels may contribute more or less to the gravity of the disorder in many instances, and in fatal ones may even prove the principal cause of death.

I now proceed to what may be termed the Associated Pathology of heat-stroke, *i. e.* to the affinities which the disorder manifests to others which differ from it considerably in outside show. Sir H. Holland thinks that we have not yet drawn sufficiently from this source of knowledge. "It is probable," he continues, "that we may hereafter learn from it the virtual identity of many diseases hitherto placed asunder by distinctions which have foundation only in subordinate symptoms, thereby disguising from us what is most important both in pathology and practice." Dr. Pirrie, in his recent excellent little work on 'Hay Asthma,' has well stated and supported the view that many cases which are often imagined to be dependent on odorous emanations, are really the results solely of increased temperature, and he proposes for such the name "summer fever;" I am convinced that he is right. During three or four years successively I have suffered in my own person with a more or less severe catarrhal fever, which commences about the middle of July, and lasts about a month.

The symptoms are great debility and prostration, anorexia, inability for brain work, or almost any other, cutaneous hyperæsthesia, so that I shrink from the summer breeze as too chilling, and pretty severe nasal and pharyngeal catarrh, with expectoration of heavy, ill-looking muco-pus. I have not the least asthmatic tendency, nor am I the least intolerant of hay or other odorous substances. On one occasion, after eighteen or twenty days of the catarrhal symptoms, I got smart rigors, followed by pyrexia and sweating, with very great prostration. Tonics are beneficial, and all such means as recreate nerve-power. I have no doubt of the intimate connection of the disorder with atmospheric heat acting on a not over-robust system. My friend, Dr. Palmer, learnt from an intelligent practitioner, whom he met in Yorkshire this year, that he often had cases of slight sunstroke in children, in whom, after a semi-comatose condition, with a feeble pulse and cool skin, had lasted for some hours, reaction usually followed, and was succeeded frequently by catarrhal symptoms, or sore throat, &c. Two or three years ago an elderly lady, an habitual bronchitic, was returning to her home in London on a very hot day, and sat during a journey of more than 100 miles in a first-class carriage exposed to the heat of the sun's rays, which distressed her a good deal. When she reached her house she was in a state of fever, and three days later I was called to attend her in a dangerous condition. The usually moderate bronchial catarrh was increased to great intensity; she suffered very great dyspnœa, and was very prostrate. So great was the nerve prostration that when she recovered she told me that she had been quite unconscious of all that had been going on around her, at least she remembered nothing about it; moreover, for weeks after, she had great difficulty in writing, she could not recollect the right words, nor remember how to spell them correctly. In this instance we have nerve paresis and inflammatory congestion as results of heat, aud it seems only reasonable to believe that the latter was dependent on the former. I have already alluded to the probability that most cases of *summer diarrhœa* are produced in the same way. So it was, I think, in the following instance, which is by no means uncommon, and often runs into English cholera. J. W—, æt. 41, a robust, strong, perfectly temperate labourer, was taken ill July 8th of this year, about 2 p.m., with diarrhœa and severe flatulence, and great pain all over the body. When I saw him about 4 p.m. he could hardly speak at all, and was eructing continually. His pulse was 69, weak, skin cool and damp. He was so ill that he was taken into the wards. With ether, sal volatile, and opium, his disorder rapidly subsided. It did not appear that he had taken anything to disagree with him. My reading of the case was heat-affection of the solar plexus conditionating pain in the related plexuses and paralysis of the vessels of the mucous surface of the intestine. It will be remembered that in Dr. Palmer's case of heat-stroke there was unilateral pain and catarrhal flux on the same side. In India Sir R. Martin says we are familiar with dysenteries, hepatic inflammations and congestions as acute sequelæ to sun-stroke. Is not the pathogenesis of these such as I have above suggested, viz. paresis of vaso-motor nerves determining hyperæmia, which in states of debility passes into actual inflammation?

Another malady which seems to be allied to heat-stroke is *roseola æstiva*, of which I have seen several instances. In one particularly the patient's surface was very extensively red, and the hyperæmia issued in a copious serous discharge; in fact, he had an *external* diarrhœa. In this case there were no notable symptoms of cerebral affection, the vaso-motor nerves of the surface were alone involved; but in Cazenave's description mention is made of shiverings, depression, headache, sometimes agitation, slight delirium, and even convulsions, with hot skin, thirst, anorexia, and constipation, or diarrhœa; so that it is evident that the nervous derangement may be very extensive. Sore throat is often present, and it is remarkable that, as Dr. Broadbent states, it has been remarkably prevalent this hot summer.

Eczema is sometimes evidently the result of heat (eczema solare). Some time ago I saw a young officer who had recently been sent home as an invalid from a tropical country in consequence of an intractable eczema of the face. Since his arrival at home considerable improvement had taken place. His general health was good, although he had suffered from ague, and there was no other apparent cause for the malady than the injurious influences to which he had been exposed. The skin of his face was unduly red, and on the least excitement of the circulation, or exposure to heat, it became very flushed. Serous effusion occasionally took place even at home—in the tropics it had been copious. His cutaneous vessels and their nerves (in the face) were evidently toneless and feeble.

My remarks on Treatment must be very brief. The essential indications are to restore nervous power, to sustain the action of the heart, and to relieve congestions. The cold douche has approved itself as a useful remedy, and an Indian officer has informed me that it is best applied to the epigastrium, which is painfully hot. Drs. Levick and Darrach, in America, have found it a successful proceeding to rub the surface of the body with pieces of ice. Out of seven cases of severe sunstroke, which were treated in this way, six recovered, and among them two whose temperature in the axilla had risen to 109°. The one who died was a man of sixty-five. In one of these cases the rubbing with the ice had to be continued for one hour and a quarter before the patient began to recover his consciousness. Out of twelve other cases admitted previously to these, but in the same month, and treated with stimulants, cold affusions, or the full bath, seven died. Useful as cold douching may be in many cases, I think it should not be employed indiscriminately. When the action of the heart was very feeble, there would be danger of its being arrested altogether. Brown-Séquard warns us that death may be produced in this way. He has seen, he says, asphyxiated puppies, whose hearts were still beating fifteen or twenty times in a minute, killed at once by being dipped into cold water, the heart stopping by a reflex action. In the convulsive form of the malady, attended with extreme nervous irritability, Dr. Barclay says the douche is inadmissible, from the agony it occasions, and in such he has found chloroform inhalation useful, sometimes availing even to the preservation of life. Recently, I believe the use of warm fomentations to the head has been recommended, and I can quite understand that in such cases as those last mentioned they might be serviceable. (*vide* 'Brit. Med. Jour.,' 1868, vol. ii, p. 311.) Mr. Wrench has lately ('Brit. Med. Jour.,' August 15, 1868) spoken very highly of the use of opium in cases of predominant cerebral affection tending to issue in coma or convulsions, and preceded by sleeplessness. He uses it as a calmative, aiming especially at procuring sleep. I think, however that it might be given with advantage in small repeated doses, combined with ether or ammonia in cases of a mixed kind, where, together with more or less collapse, there were signs of cerebral exhaustion and irritability. Effervescing ammoniated saline, with excess of ammonia, would probably be a good form, and the opium might either be added to it, or given in combination with camphor, in a pill. Sir R. Martin advocates this practice, combined, in suitable cases, with local blood-letting. The hypodermic injection of morphia has been used with apparently good effect in the Pennsylvania Hospital. In those instances where the cerebral hyperæsthesia persists for several days, attended with more or less prostration, bromide of potassium will probably render great service. At the same time, wine or other restoratives may be administered. In all cases, absolute quiet, repose of mind and body, and coolness of the atmosphere, must be ensured as far as possible. Purgatives should not be neglected; one mercurial cholagogue dose at least should be given as soon as it may be safe, and may be repeated if it seem advisable. Much, of course, must depend on the constitution with which we have to do. A weakly, anæmic woman, and a robust, full-blooded man, are not, of course, to be dealt with alike. Many of the worst cases will probably prove fatal, do what we may; the nervous energy is too deeply sunk to render recovery possible. Two remedies may, however, be named which would be worth trial, in addition to those already noticed. Where the chief peril was from asthenia, the pulse evidently failing, I should give tinct. digitalis in quickly repeated doses of ℳx, which might be injected subcutaneously if the patient were unable to swallow. This drug has been found by Dr. Murray of great use in typhus fever in sustaining the heart's action, and other testimony is not wanting to show that its primary action on the heart is stimulating. Dr. Gordon uses firing with a hot spatula. Where, on the other hand, the peril was from coma, besides the arousing application of sinapisms or blisters to the nucha, I should administer strychnia, a drug which I am sure acts often with good effect in recreating depressed nerve power, and approves itself in my hands quite as much a tonic to the brain as to the cord. Having regard to the defibrinised condition of the blood, it seems not improbable that acids, vegetable or mineral, might be beneficial. Lemon juice, or nitric acid, diluted, would form agreeable drinks.

Dr. T. G. Glover, writing of the use of dilute sulphuric acid in hot weather, says it is often extremely toning in its effects. Together with half a glass of sherry daily, it put a stop to attacks of semi-syncope in a boy eight years old. Dr. Gordon employed arteriotomy in the case of a young man with free purging by calomel + ol. croton, and vesication to the nape. He was quite apoplectic when attacked, but returned to duty in four days and remained well.

With respect to bloodletting, I am disposed to think that, *timely* employed (on which Sir R. Martin justly insists success depends), it may occasionally be serviceable, either in the form of V.S. to relieve an oppressed right heart, or as a local depletion to lessen congestion of the brain. Dr. T. Ballard states that he has in several instances found the application of leeches to the head very beneficial. Mr. G. Brown related to me a case where a V.S. to 20 ounces was very beneficial, giving immediate relief to great cerebral distress and convulsive agitation. Dr. B. W. Richardson records a striking example of the efficacy of full V.S. in heat-stroke (*v.* 'Practit.,' Nov., 1868). A man was brought out of the harvest-field insensible, was bled to 4 pints, and in half an hour was able with assistance to walk home.

In the management of the sequelæ we must bear in mind that the great object is to restore the tone of the nervous system. This will in most cases require great patience and perseverance on the part of the patient and his adviser. Relapses must be expected, and we must be satisfied if we gain ground decidedly, though slowly. A bracing air, sufficient rest, freedom from anxiety, interesting occupation varied with plenty of out-door recreation, and a tolerably generous diet, are almost essential. Exposure to a hot sun should be avoided as much as may be, as well as hot rooms, late hours, dissipation, and so-called gay life. As medicines, cod-liver oil, strychnia, quinine, iron, valerianates of zinc, iron, and ammonia, nitromuriatic and sulphuric acid, and hypophosphites may be mentioned as likely to render good service. The doses of cod-liver oil need not be large, ʒij a day may suffice. Small doses of opium with iron, or quinine or camphor, Indian hemp, tannin, and nitrate of silver, may in particular instances be employed very beneficially. The two latter are appropriate to conditions where the stronger tonics cannot be borne. Nitrate of silver is, I think, really useful in vertigo and certain other cerebral disorders, and if given in $\frac{1}{4}$ gr. doses, *ter die,* for three weeks at a time, with sufficiently long intervals, there need be little fear of discoloration. The cold douche to the head once or twice a day should not be forgotten. In many instances I have no doubt residence at a prudently conducted water-cure establishment, such as Dr. Grindrod's, at Malvern, would be beneficial.

I subjoin a tabular representation of the causal relation which I conceive to exist between heat and the various morbid phenomena which are attributable to it.

Heat causes nerve weakness.

Nerve weakness causes hyper-excitability or prostration. Either or both of these conditions may be met with in the same person, one centre may be hyper-excitable, another prostrated, both alike being enfeebled.

Hyper-excitability appears as delirium, mania, anxiety, insomnia, tinnitus aurium, quasi-hysteria, convulsions, palpitation, formication, dryness of surface.

Prostration appears as coma, drowsiness, giddiness, incapacity for mental exertion or attention to business, impairment of sight and hearing, numbness, pain, paralysis, syncope, fever, erythemata, local hyperæmias, extravasations, diarrhœa, incontinence of urine.

The above symptoms, or modifications of them, variously grouped, are often combined with more or less hyperæmia of the head, *but are not dependent on it,* at least in the majority of cases. This is a capital point.

In concluding I have only to add that in this malady, as in all others, routine treatment is wholly objectionable, and that every case has its special peculiarities, which must be regarded, and the remedies adjusted to their requirements. We start with a *causal diagnosis,* and there can be no question that the operation of the same cause acts on different individuals so as to produce very various results. The mode of operation is indeed the same in all, but the phenomena are different, because the same nervous centres do not suffer in all, nor do they suffer exactly alike, nor to the same relative extent. Hence the morbid picture must be continually changing. Sound principles of action remain, however, sure guides.

CHAPTER XII.

TETANUS.

It is no more than we might have expected, that morbid excitement of the brain should have its analogue in a similar state of the cord. This is presented to us undoubtedly in the disease termed Tetanus, and probably, also, in one or two other allied states. The immediate cause of the excitement is as yet a moot point. We have, first, the view that the disorder depends essentially on irritation proceeding from injured or diseased peripheral nerves, which, arriving at the nerve-cells of the spinal cord, greatly intensifies their excitability: the morbid condition thus generated becomes persistent, and may continue after the original exciting cause has been removed, just as occurs in some forms of delirium and epilepsy. Secondly, there is the theory which regards tetanus as the result of a poisonous matter formed in the blood, or absorbed into it from an unhealthy secretion of a wound. This acts like strychnia, setting up that peculiar irritable state of the cord which is the essential condition of the phenomena, and without which the various slight excitants which produce the spasms would take no effect. Thirdly, a view has recently been advocated by Mr. Lockhart Clarke ('Med.-Chir. Trans.,' 1865), which is a modification of the first, and is based on accurate examination of the cords of persons dying of Tetanus. He finds constantly lesions of structure consisting in exudations and disintegrations of tissue which will presently be more particularly described. These lesions are precisely similar in character to those discovered in the cord in many ordinary cases of paralysis; and on comparing together the lesions and symptoms of both kinds of diseases, he arrives at the following conclusions:—1st. That the lesions are either not present, or are present only in a slight degree in those cases of tetanus which recover. 2nd. That they are not the effects of the great functional activity of the cord, manifested in the violent spasms, but are the effects of a morbid state of the blood-vessels. 3rd. That they are not alone the causes of the tetanic spasms. 4th. That the tetanic spasms depend on two separate causes: first, on a morbidly excitable condition of the grey substance of the cord, induced by the hyperæmic and morbid state of its blood-vessels, with the exudations and disintegrations resulting therefrom. This state of the cord may be either an extension of a similar state along the injured nerves from the periphery, or may result from reflex action on its blood-vessels, excited by those nerves. Secondly, that the spasms depend on the persistent irritation of the peripheral nerves, by which the exalted excitability of the cord is aroused; and thus the cause which at first induced in the cord its morbid susceptibility to reflex action is the same which is subsequently the source of that irritation by which the reflex action is excited.

The supporters of the second view justly insist on the prime necessity of accounting for the condition of exalted polarity of the cord, which they think can hardly be explained on the theory of peripheral irritation alone. They insist further that it gives an explanation of the idiopathic form, and of the occasional epidemic or endemic prevalence of the disease. They notice also the considerable resemblance between hydrophobia, a malady undoubtedly of toxic origin, and tetanus. It is also of some weight that division of the nerve proceeding from the seat of the injury in traumatic tetanus has by no means proved so frequently successful as one would expect if peripheral irritation were the sole cause. Another fact which may be cited in support of this view is, that foul air tends powerfully to promote the occurrence of the disease, as shown by the case of the Dublin Lying-in Hospital, where, by means of improved ventilation, &c., the mortality from tetanus in the infants was reduced to nearly one tenth of what it had been. To the same effect is the circumstance that Tetanus seems at times to assume an almost epidemic character. Dr. Richardson says that he knew one surgeon whose operations it once followed for some weeks as though he carried the cause of it with him. In some hospitals a run of cases of Tetanus has occurred, and at St. Mark's it is specially mentioned that among 1763 operations performed upon hæmorrhoids with the ligature there were 5 cases of Tetanus. Four of these occurred in the spring of 1858, a year in which the disease was more frequent than usual in other hospitals. From 1858 to 1865, more than 800 operations have been performed, but no case of Tetanus has resulted. ('Med. Times and Gaz.,' 1865, September 2nd.) There is much in this theory to commend it, but until it is proved that any secretion of a wound can, on being inoculated, give rise to tetanus, it must remain a mere hypothesis. We have no example of any similar morbid production setting up notable nerve disorder. In glanders and farcy, in malignant pustule, in pyæmia, in syphilitic and smallpox inoculation, and in snake bite the phenomena are much more those of stagnating circulation and impaired blood crasis than of nervous excitement. The most various kinds of ulcers scarcely ever give rise to tetanus. Syphilitic sores, primary and secondary, tuberculous cavities, pulmonary gangrene, the intestinal lesions of typhoid fever and dysentery rarely if ever have this result. Yet it is surely probable that a poison might be generated in them which would give rise to tetanus if this were the true pathology of the disease. Moreover, in various instances, tetanus has commenced some time after the wound, which may have been very slight, has healed. In some, again, the nature of the effective cause makes it most highly probable that no poison was concerned in their production. Such injuries as the blow of a whip-lash, a sparrow's bite of a finger, the cutting of a corn, can scarcely be thought to have any toxic action.

On the other hand, the theory which assigns to local irritation the chief place in the causation of the disease has, especially in non-fatal cases, much evidence in its favour. The well-known greater tendency of lacerated wounds than of incised to be followed by tetanus is very strongly shown by Mr. Poland's figures. He states that at Guy's Hospital the disease occurred only in 1 case out of 1364 when the wound was made by a clean sharp knife, but it ensued in 1 out of 55 when the nerves were injured as in accidents. Occasionally the spasms are almost entirely limited to the side injured. Two such are recorded by Dr. Macleod ('Notes on Surgery of Crimean War,' pp. 155—161). Langenbeck ('Syd. Soc. Year-book,' 1863, p. 220) records three cases which go to prove that tetanus may be dependent on local irritation. In the first he removed by an incision the fragment of a needle, the symptoms immediately lessened, and next day the patient was well. In the second the removal of a ligature from the spermatic cord, which had been tied *en masse* after castration, at once stopped all the symptoms. In the third case the reduction of a fracture which was attended with great displacement had the desired effect. Post-mortem examinations supply corroborative evidence. Froriep ('Romberg,' vol. ii, p. 104) found in 7 cases the nerves proceeding from the injured part to the spinal cord affected at intervals with a peculiar inflammatory change, consisting in nodulated tumefaction and reddening of isolated points, separated from one another by healthy tracts. He thinks these are peculiar to tetanus. Lussana's statement ('Schmidt's Jahrb.,' vol. 108, p. 168) goes to confirm this, who makes one of the points of diagnosis between neuralgia and neuritis, that in the latter the muscles are affected by severe and violent, continuous, tonic and clonic, tetanoid contractions. Mr. Erichsen also says that he has never failed to find the nerve running from the wound more or less inflamed, and often for a considerable distance, whenever it has been carefully looked for. Not a few cases are on record where foreign bodies have been found in the seat of the injury. Hasse mentions that very frequently the lodgment of splinters of bone, or the like, among the tissues has decidedly influenced the development of tetanus. The very great rapidity with which the symptoms succeed to some injury in certain rare cases seems to render it almost impossible to assign any other exciting cause than that of nervous irritation or shock. A predisposing, however, there probably is in such instances of peculiar intensity to which we shall presently advert.

As to Mr. L. Clarke's view there can be no question of the correctness of the observations on which they are based, according as they do with the appearances visible to the naked eye, and confirmed as they have been recently by the examination of Dr. Dickinson ('Med.-Chir. Trans.,' vol. 51). This writer describes the alterations in the case he examined as follows:—"(1) A remarkable injection of the blood-vessels in certain parts of the cord, by which they become replete to distension with their natural contents, while in a few situations blood-corpuscles had escaped from their proper channels, and diffused themselves among the nervous elements. (2) A structureless transparent material had been poured out in the immediate vicinity of the vessels, not only into such vacant spaces as exist in the fissures of the cord, but forcibly intruded into many parts of the solid structure, tearing up the tissue, and displacing the neighbouring parts. Besides these changes, which affected both the white and the grey matter, the white columns presented circumscribed alterations, which, in conjunction with the effusion described, caused the swellings which were so conspicuous on the surface of the cord." Both the above cited investigators recognise fully the existence and importance of peripheral irritation, and do not attribute more to the organic lesions they have discovered in the way of causation than that they promote and intensify the morbid action. It seems very probable that the existence of such lesions in the cord after recovery may account for the persistence of certain symptoms in a modified form, as a degree of painful rigidity of the muscles very liable to be aggravated by slight causes, or the peculiar alteration of the features noticed in a case recorded by Dr. Currie, where it is said that the patient's eyes appear hollow, his face sharp and pale, his cheeks and lips being skinny, and his masseter muscles hard and shrivelled. Such alterations are very suggestive of persistent spasm of vaso-motor and musculo-motor nerves, which must depend on some abiding lesion. It is very interesting to find the same kind of changes taking place in the cord in Tetanus, which v. d. Kolk has described in the medulla oblongata of the epileptic. Distension and dilatation of vessels, exudation of albuminous fluid, and extravasation of blood occur in both. In both, I think, we must believe that the cells and fibres of the nerve centres take the initiative in the morbid process, and that the vascular and exudative changes are consecutive. This opinion seems to receive confirmation from recent investigations of chorea. In some of the fatal cases collected and commented on by Dr. J. W. Ogle the vessels of the cord were found much congested, and in two which were examined by Mr. L. Clarke very much the same alterations were discovered as are present in fatal cases of tetanus. Now that which is common to both these diseases is excitement of the spinal nerve cells, though this does not express itself in the same way. Nevertheless although the mode of morbid action be different, the visible alterations are similar because in both they are secondary to the derangement of the nerve tissue.

The production of the congestion and effusion is probably effected in the same way as in all parts which are the seat of irritation, and may be described, I conceive, as follows. Normally the arteries are kept in a due state of contraction and the capillaries duly retentive by the vaso-motor nervous influence which they receive. But there can be no doubt that the same vaso-motor nerves are also distributed in part to the adjacent tissue elements, and if these be over-excited the nervous influence is withdrawn from the vessels, and then engorgement and effusion result. The same changes are found when the nerves are more directly paralysed, as in heat-stroke.

Before returning to our theories of Tetanus let us consider the nature of the predisposition, in which, as Sir Thomas Watson says, "the real mystery lies." The remarks made at p. 157 go to show that Hyperexcitability is a morbid state to which all nerve centres are prone, and which in different situations appears in different guises. In the cord it constitutes in one of its phases the essence of Tetanus, in another of Chorea. According to its degree will be the intensity of the spasms, and the readiness with which they are induced by any casual excitation. Its causes are various, sometimes peripheral irritation, external or internal; sometimes immaterial influences, acting directly, as heat or malaria; sometimes a demonstrable toxic agent. Thus much we may affirm generally; but why this state should arise in the spinal centres, and not in others, and why the nerve disorder should assume the special form, which it does in Tetanus, and not that of some other (chorea, for instance), cannot be explained. Mr. L. Clarke notices expressly that the lesions of the cord in cases of paralysis, in which there is commonly no spasm, are similar to those of tetanus. From this it must be inferred that there exists some peculiar invisible modification of the undamaged nerve-tissue, which conditionates the particular character and quality of the phenomena. The lesions which are found in fatal Tetanus cannot constitute the predisposition, for they are present in cases where no Tetanus appears, and can hardly be supposed to exist in those instances where there has been no deviation from health until a short while before the symptoms set in. The analogy of epilepsy, also, makes very decidedly against the view that the lesions are at all essential to the occurrence of the symptoms, though they may very possibly intensify their severity.

Of the several views we have now considered, that which refers Tetanus to peripheral irritation seems to me to have most evidence in its favour; but I am much inclined to believe that none of them is exclusively true. When we consider the amount of irritation of centripetal nerves that is continually undergone without any tetanus ensuing, we cannot but admit that some prior condition must exist which gives the former its effect. The deficiency, not the entire absence of this condition, is particularly well shown in such a case as the following:—A lady, æt. about 35, cut her thumb with broken glass; soon after she felt some degree of stiffness of the jaws, and a peculiar nervousness. She took ammonia and bark, and had no serious disorder. This, we may say, was an abortive case of tetanus, the characteristic symptoms just began to appear, and then died away for lack of sufficient predisposition. Those who invoke Embolism so freely to solve pathological knots, will, perhaps, have recourse to it in this, but I prefer to admit my ignorance of the intimate nature of this important element of Tetanus, and to recognise simply that it and similar modifications of *vis nervosa* are of very common occurrence, and are not obscurely related to paralysis.

The immediate causes of the peculiar predisposing Hyperexcitability may be very various. Sometimes it may be generated by the peripheral irritation, sometimes by heat or by malaria acting slowly over a long time, sometimes by some retained excretion, perhaps, or by foul air, sometimes by depressing mental states. It is very possible that the result may not be entirely due to one cause, but to two or more acting together. I believe it is with Tetanus just as it is with Epilepsy and many other diseases: from the phenomenal side of view there is great similarity in individual cases, while from the *causal* there is great diversity. This belief has an important bearing on treatment.

Another point for remark is that it seems very possible, while the phenomena and causes are apparently, and, perhaps, often really quite alike, that the *quality* of the nerve disorder may differ much in different instances. Just as one case of acute delirium in typhus is calmed by brandy, and another by antimony, so it may be with Tetanus. It is evident that if this be really the case, no uniform mode of treatment can be adopted. The cases which I shall presently cite afford much ground for regarding this view as correct.

It is often said that Tetanus is the result of increased reflex excitability of the cord; and this is, no doubt, in great measure true. It seems to me, however, somewhat doubtful whether there is not more than this in the matter on account of the intense pain with which the contractions are attended. In cramp there is often very considerable pain without any extreme contraction of the affected muscle; in fact, it appears very much as if the cramp were essentially a disorder of the sensory nerves of the muscle, which might be attended with more or less contraction of the fibres, but which was not proportionate to such contraction. Warmth to the cramped part often relieves the morbid sensation, the muscle not having been moved. Tetanus is evidently much allied to cramp, and the intense pain of the spasms appears to me to set a broad distinction between this kind of contraction and that which is healthy and natural. No amount of voluntary muscular effort that we can make generates any pain like that of cramp, the sense of fatigue is quite different. I think, then, that in tetanus the pain is not merely the result of intense muscular action, but a token and effect of morbid action in the spinal nerve-cells.

As to the *nature* of this morbid action of the cord, I can only remark that it manifested decided affinities with that which gives rise to paralysis. Mr. L. Clarke states that the lesions found in fatal cases of Tetanus are exactly similar in kind to the lesions or disintegration which he finds in various cases of ordinary paralysis. Prolonged exposure to heat is known to have a considerable influence in promoting the occurrence of tetanus, and that it enfeebles the nervous system, and renders it more liable to a variety of derangements, or when severe actually paralyses it, as in heat-stroke, is also notorious. Exposure to wet and cold is a recognised cause of tetanus; and paraplegia has often resulted from the same circumstances. The pain attendant upon tetanus is often of the nature of neuralgia, and such pain we have already shown (*vide* p. 44) to be a mode of sensory paralysis. Injury or disease of the hemispheres, or their investing membranes, may give rise to tetanic contraction succeeded by paralysis, the same lesion appearing to produce both phenomena. Dr. Wilks mentions the case of a man "who received a fracture of the skull, and had his brain lacerated. He had convulsions, after which the left arm and leg became rigid, and in 3 or 4 days they were paralysed. The brain on the right side was found to have been torn to some depth, but the central ganglia were apparently uninjured." ('Guy's Hospital Reports,' 1866, p. 196.) In two of the cases subsequently recorded, paralysis coexisted along with tetanic phenomena, and as it seems to me, in consequence, mainly of the same morbid process that gave rise to the convulsion. We have already produced some evidence to show the close connection subsisting between spasm and paralysis.

Without pressing these facts beyond their proper reach they may be regarded, I think, as strengthening the evidence that the state of the cord in tetanus is essentially one of impaired functional power, and not solely of undue readiness to act. If we try to frame to ourselves an idea of the qualities necessary to a nervous-centre for healthy working, it is clear that there must be these two, viz., a power to act when called into play, and a power of remaining at rest. The one is as necessary as the other. Without sufficient periods of quiescence reparative nutrition cannot be carried on in an orderly way, and the due function of the cells cannot be maintained. The essence of Tetanus and some similar states seems to consist in the nutritive actions of the cells being so altered, in their becoming so confused and hurried that quiescence is impossible. Such disorder may be induced by inflammatory irritation, but is much more often by a derangement of the molecular condition of the axis cylinders (probably) of some afferent nerves, which is propagated by continuity to the soft granulous contents of the nerve-cells of the centres, and excites in them a similar derangement. It is the diffusion of this altered state of nutrition from cell to cell throughout the cord which makes tetanus the formidable malady it is. If the change remained limited to the cells in immediate connection with the irritated fibres, the disease would be no more than some crampy neuralgias are.

As to the Therapeutics of tetanus, it does not matter which view we adopt of the pathology of the disease. If the symptoms depend upon a poison we have no means of eliminating it or destroying it in the body. Our efforts are confined in this, as in almost all other cases of the same kind, to counterworking the morbid action. Certainly it will always be desirable to promote, as far as possible, a healthy state of the wound, if there be one, to correct a faulty state of the secretions, and especially to provide for an ample supply of pure, cool, fresh air. The importance of this in preventing pyæmia and hospital gangrene is acknowledged on all hands, and I am sure its calmative influence on undue nervous excitability can hardly be over-estimated. The exhausting nature of the disease should be kept in mind from the first, and wine and nourishment should be freely administered, unless, at least, for special reasons it may appear desirable to forbear their administration. Careful examination of the wound should be made to detect any foreign substance lodged in it, which might act as a cause of irritation. Such intruders are sometimes rather deeply seated. Should any evidence of neuritis be discovered in the course of nerves proceeding from the injured part, this would certainly call for treatment. Leeches applied along the painful tract of the nerves, and continuous poulticing, are the means I should advise. Division of the nerve or nerves likely to be concerned in propagating the irritation to the cord should, if possible, not be omitted, though, as Romberg tell us, "it has frequently been ineffectual." Besides Dr. Murray's well known case, one has been recorded by Mr. Wood where division of the internal saphenous nerve, which was irritated by a comminuted fracture of the leg, arrested permanently the tetanus which had set in two days before with severe convulsion. Dr. Fayrer, of Calcutta, divided the median nerve in a case of wound of the hand with decided advantage. It is desirable that the division should be made at some distance from the wound on account of the possible extension of morbid changes in the direction upwards.

A leading idea in the management of tetanus should be that the most salient phenomena are not a sure guide to an appreciation of the *quality* of the morbid action, and that, consequently, we must not expect to find the same remedies useful in every instance. No experienced practitioner would affirm that acute delirium is always to be treated in the same way, nor should we expect it to be otherwise in acute tetanus. Holding fast this principle, which is one that applies to almost all maladies, we will proceed to review the various remedies which have most claim to have rendered real service in Tetanus.

Bloodletting is scarce mentioned in the present day; but I am not satisfied that we should be right in rejecting it *in toto*. Mr. Curling cites a case of idiopathic Tetanus cured by large and repeated V.S. The patient was a man, æt. 35, who had been exposed to the sun without food or covering, and was not brought under medical care until the disease was fully established. The spasms affected nearly all the muscles of the body, but particularly those of the jaw and abdomen, together with those of the back part of the neck. The abdominal muscles became particularly rigid when touched, and any pressure produced a general spasm all over the body; deglutition was extremely difficult, so much so that in drinking any liquid he appeared as if suffocating; respiration short and anxious; pulse 100, full and hard; tongue loaded; skin wet with perspiration, but not much hotter than usual; gets little rest at night. No traumatic lesion is mentioned. This account, which I have taken from the original paper, makes it certain, I think, that the case was not one of acute spinal meningitis, but really and truly Tetanus. The treatment pursued was heroic enough, and can hardly have been inoperative for good or evil. The daily record and the ultimate issue go to show that it was beneficial. On the first day of treatment the man was bled to 40 ounces, and had 24 leeches to the abdomen; the second day he was bled to 30 ounces, on the fourth to 28 ounces, on the fifth to 28 ounces, on the twelfth to 32 ounces. Besides this he was freely purged, and complete mercurial ptyalism was induced. The pulse remained full and hard until after the fourth bleeding; the blood of the first three was buffed. He seems to have become convalescent in 18 or 20 days, and was ultimately discharged quite well. ('Edin. Med. and Surg. Journ.,' vol. xxiv, p. 309.) I have not much expectation of ever meeting with a case of Tetanus which it would be desirable to treat with such active depletion as was practised in the instance now narrated; but, assuredly, our success with other measures, is not such as to warrant us in assuming that we have discovered the best method of dealing with the disease in all its forms, and that we can always dispense with the experience of our predecessors. The case above related does not stand alone. Mr. Curling cites some experience which shows that the spasms may be relieved by V.S., and evident amendment produced, though the ultimate issue has been unfavorable. Dr. H. Sandwith ('Lancet,' 1846, vol. i) gives the history of a man who had traumatic Tetanus, and was bled twice to 14 ounces, and once to 8 ounces in three days, besides being leeched and having calomel and tartar emetic freely. The tetanus disappeared in 5 days. The following case was mentioned to me by Mr. Wood:—

Case i.—W. B—, æt. 33, a strong, robust, farm labourer, of average height and sanguine temperament, was exposed to the heat of the sun on July 13th, the rays not falling on his head, which was protected, but on the back of his neck. On the same day he found he was unable to eat the peas he had been shelling, for they rolled out of his mouth as fast as he put them in. He managed, with difficulty, to swallow some bread and milk in the evening, went to bed, and slept well. On 16th he complained of stiffness of his jaws and inability to open his mouth. On 18th Mr. Wood found his limbs perfectly rigid, as also his trunk, and his jaws firmly clenched. Pulse 120, full and strong; profuse perspiration; face dark red; respiration hurried; power of swallowing and articulation perfect; bowels confined; urine natural; lungs and heart healthy; abdomen enormously distended, and very painful on pressure, especially at the epigastrium; a complete sardonic grin, and complete opisthotonos. Ol. Crot. ♏ ½ 4tis horis ad sedes, Calomel gr. i 2dis horis. 20th. Bowels had been moved, but not freely; stools dark and lumpy; pulse 130, full and bounding; face dark red; rigidity excessive, strong opisthotonos, respiration hurried. He was bled to 40 ounces, the blood being allowed to flow till the spasm was relieved. This measure afforded great relief; the blood was not cupped or buffed. Blister to neck. Croton. Ol. 4tis horis ad vices vi, Pt. c. Calomel. 22nd and 23rd. Pulse 96, better; face less red; no opisthotonos; can bear slight pressure on stomach without its causing spasm. 24th. Bowels freely open; pulse 86. Still much rigidity. Calomel omitted next day. After this improvement went on steadily until the middle of August, when he was able to walk about comfortably. Galvanism (interrupted current, probably) was employed a few times, and seemed to have a good effect in relaxing the muscles.

It seems to me not doubtful that the V.S. in this case was of very great service; I doubt whether recovery would have ensued had it been omitted. The patient was thought by his friends to be dying just before. My conclusion, then, as regards bloodletting is that in robust persons with a strong, full pulse, we may and should employ this remedy. To reduce intra-vascular pressure in states where the affected organ often suffers hyperæmia amounting to extravasation, seems to me rational practice, provided, of course, that it can be done without enfeebling the heart too much. At the same time I am much disposed to think that the same end may be obtained in many instances by other remedies. Both Hasse and Sir T. Watson admit that a timely V.S. may be really beneficial.

Several other depressant remedies have been beneficially employed, the most important of which are Antimony, Aconite, Tobacco, and Calabar bean. The first of these has so marked a controlling power over many cases of active delirium that I should *à priori* anticipate it might prove serviceable in Tetanus, and there is evidence that such is the case. Hasse says we should not be withheld by fear of debility from giving this remedy as early as possible, but he does not recommend its being continued longer than 24 hours without a pause of 1 or 2 days, after which, if necessary, it may be resumed. I doubt whether such interruption of the treatment is desirable in cases which are suitable for the use of this drug. Antimony is one of those remedies of which some patients soon get very tolerant, while others are very much the reverse. In some cases it seems simply to antagonise the disease, in others it rather antagonises the vital powers. Of course in the latter kind of cases it must be immediately discontinued. Sometimes, however, I believe, by good management, we may obtain its good effects without its evil ones. Brandy given along with it will obviate depression, opium prevent intestinal irritation, calumba restrain vomiting. Mr. Lockhart Clarke recommends its employment, and says that any depression that might be caused by the antimony would be much less than the exhaustion of the nervous system resulting from the violence of the spasms. ('Lancet,' 1864, Sept. 3rd.)

Aconite is not a remedy of which I am fond, being aware of the great susceptibility of the nervous system in some persons to its influence, and of the alarming depression of the heart which it may easily induce. Yet I am much disposed to think that in appropriate cases of Tetanus it may really be serviceable. Its efficacy in some cases of neuralgia cannot be questioned, and a remedy which can act as a soother of pain is likely to be a calmer of spasm. The case recorded by Mr. de Morgan ('Brit. and For. Med.-Chir. Rev.,' April, 1859) affords evidence that the disease may render the system more tolerant of this poison. His patient, a strong well-formed lad, æt. 15, who seems to have had Tetanus in a very marked if not in a severe form, "the whole body being quite rigid," took for about 4 days ♏v of Fleming's tincture of aconite *2dis horis*, without any toxic effects ensuing, the pulse, however, which at one time was 106 or 135, fell to 60 or 65, and the active spasms ceased, though the chronic rigidity continued. The aconite was gradually discontinued as the disease declined. When it had quite ceased, 24 days after he had left off the aconite altogether, another trial was made of its effects. On two occasions ♏x of the same preparation given in the course of 2 hours produced no decided effect, but 4 days later ♏xv given in 4 hours were followed by very marked symptoms of aconite poisoning. A similar case is cited which was under the care of Mr. Page, of Carlisle. The disease was caused by a gunshot wound, and the symptoms which increased rapidly after their first appearance were severe during the first 6 days of the 30 occupied in the administration of aconite. The drug was given in large doses, which affected the patient at times alarmingly, but on all occasions the symptoms were subdued after the aconite had been fairly given. The patient recovered, the symptoms for the last 14 days being very mild. In this case of Mr. Page's it can scarcely be doubted, I think, that the aconite was beneficial, even if it remain an open question whether recovery would not have ensued without its having been given. In Mr. de Morgan's case the great tolerance of the poison conferred by the disease is certainly the most striking fact, and I quite agree with him that where such tolerance is apparent it shows that the morbid influence is antagonised by the remedial. There may be exceptional instances, but for the most part I think we must regard such a behaviour of the system towards a certain remedy as an indication that it is suitable if not actually necessary. The tolerance and beneficial effects of alcohol in fever and snake-bite are very remarkable. Mr. Sedgwick ('Brit. Med. Jour.,' 1860, Jan. 28th) relates a successful case of traumatic tetanus treated by aconite. The symptoms were very severe, and though chlorodyne and sumbul were also given, yet it was only when the effects of aconite appeared that they subsided. Twice, when the aconite was suspended, once to try the effect, once because the tingling and giddiness were becoming extreme, did the spasms return to abate again on the resumption of the drug. The treatment was commenced on the 12th day after the accident, and the third day of the disease; it was continued 27 days. The patient was a strong healthy man, æt. 30. The above cases afford evidence enough to show that aconite may be an useful remedy, but I do not doubt that it will often fail. It is a potent agent, and the very possibility of its success depends on the heart being able to tolerate, without undue depression, the amount that may be requisite to overcome the erethism of the spinal centres. The same applies to other depressant remedies.

Tobacco is spoken of by Mr. Curling in more favorable terms than any other remedy. He holds it to be the best "that we at present possess, and one which will generally be found capable of diminishing the severity of the acute disease, and often of subduing it altogether." A scruple of the leaf infused in 8 ounces of water is to be administered per anum, and may be repeated twice or thrice daily, according to circumstances. Mr. Travers says that it may be given thus with perfect safety in the onset of the disease. At a later period, when asthenia was becoming apparent, its employment would be more hazardous. The depression and distress which it produces are however sometimes extreme, so that patients have refused to submit to a repetition of the dose. It would probably be wise to obviate these injurious effects as far as possible by the simultaneous administration of stimulants, both vinous and medicinal. Mr. Curling recommends carbonate of ammonia, and I should think champagne a very suitable accompaniment. Mr. Haughton prefers the use of nicotine to the tobacco infusion, inasmuch as in the latter the alkaloid is combined with two or more vegetable oils, the operation of which on the nervous system is unknown. He relates ('Dublin Quart. Journ.,' vol. 34, p. 172) two cases of traumatic, and one of idiopathic Tetanus thus treated. In the first case, which proved fatal, the patient was nearly moribund when the medicine was given; it had, however, the effect of causing (1) immediate relaxation of the spasm of the muscles of expression, of respiration, and of deglutition; (2) cessation of delirium, and feeling of relief from agonising pain; (3) a lowering of the pulse from 130 to 88. This case received 3 doses of ♏j of Nicotine at intervals of 2 hours. The second was the case of idiopathic tetanus; it recovered. The dose was from half to two thirds of a drop repeated several times a day, so that in 11 days 44 drops were taken. The effects noticed in this case were—(1) immediate relaxation of the muscles of the abdomen, back, and diaphragm; (2) cessation of delirium; (3) a slight tendency to increased circulation, the pulse being quickened 10 beats per minute; (4) profuse sweating, which exhaled an intolerable odour of snuff, not of tobacco; (5) a tendency to deep sleep. The adductor muscles were not as easily brought to desist from their spasm as the others, even when the hamstring muscles gave way the adductors refused. The third case recovered; the nicotine was given in doses of 1, 2, and 2½ drops, according to the urgency of the tetanic spasms. After the administration of the dose in 3 minutes the spasm was gone, and the muscles relaxed, and profuse sweating, accompanied by a smell of snuff, set in. During the 4 days of treatment with this medicine the patient received by the mouth and rectum altogether 54 drops= 32½ grains. Dr. J. W. Ogle records a traumatic case in which nicotine was given unsuccessfully. The patient was a thin delicate-looking girl, æt. 14, whose leg had been lacerated 9 days before Tetanus set in. About gr. ij of nicotine were exhibited by the mouth or rectum, and gr. iv by hypodermic injection. But little improvement resulted. ('Med. Times and Gaz.,' March 12th, 1864.) A similar instance is recorded by Mr. Barton. Mr. Tuffnell records ('Dublin Med. Press,' 1863, Jan. 7th) a case of severe traumatic tetanus in which 56 drops of nicotine were given in 6 days. The disorder ceased in 15, during three of which chloroform had been given by the mouth without benefit. The nicotine certainly seems to have been beneficial, but had to be administered per anum, owing to the disgust it produced. Mr. Tyrrell records ('Med. Times and Gaz.,' 1864, Sept. 24th) two well-marked cases of traumatic Tetanus which he treated by the local application of tobacco. Both terminated successfully. He argues that as tobacco is of service when given internally it should be more so in eccentric tetanus if applied locally, by paralysing the nerves of the affected part from which the irritation proceeds, and thus removing the cause of the spasms. In the idiopathic form he proposes to remove the cuticle of the skin of the back by a blister, and to apply a strong solution of tobacco to the denuded surface, and thinks that in this way the cord would more quickly be brought under the influence of the remedy, and with less vital depression than when it is given internally. In one of the cases reported a strong infusion of Cavendish tobacco was applied to a blistered surface 12 inches square at the back of the neck, as well as to the nose which had been injured, and the patient was supported by enemata of brandy, ether, quinine, and strong beef-tea, given every 4 hours. The treatment was begun on the 22nd, on the 24th he was able to swallow, on the 26th, the neck, which had been rigid, was quite pliant. Delirium then supervened, but yielded to quinine + opium, and in 5 or 6 days the disorder was at an end. Mr. Junor testifies strongly to the good effect of Mr. Tyrrel's plan in a very interesting case which he has published in the 'Edin. Med. Jour.,' 1867, Feb. He used at first a solution of Cavendish tobacco of the strength of ℥iv ad Oj; at a later date the strength was doubled. The case was one of great severity, and the sufferings were extreme. Within 2 or 3 hours after the application of the infusion to the wound, which was large, the improvement was most marked. All the rigid muscles became to a considerable extent relaxed, the mouth could be opened about half an inch, the paroxysms were less severe and frequent, and a good deal of sleep was obtained. There were many difficulties to be overcome before the wound was healed, and recovery complete, but the case terminated favorably in about 2 months. Mr. Junor says "There can be no doubt that the recovery of the patient was due to the tobacco stupes." Omission of this remedy was thrice followed by more or less severe recurrence of the tetanic symptoms, which were at once relieved by resuming it. Lange records a case of rheumatic tetanus occurring in a female, æt. 36. She was suddenly attacked without apparent cause by tetanus and trismus. The whole body was as rigid as iron, the mouth firmly closed, the face intensely flushed and burning. The rigidity was extremely often interrupted by convulsive quiverings. After opium, cannabis indica, and tartar emetic had been given with success, a tobacco enema was administered, and soon after an infusion of the same given by the mouth, and repeated until, in the course of 4 days, 3 drachms were taken. Immediately after the first drachm had been given the trismus relaxed; and after the third the tetanus ceased, with the exception of some stiffness of the neck, and some occasional exacerbations. She was not fully convalescent for more than a month. ('Schmidt's Jahrb.,' vol. 122, p. 179.)

Calabar bean seems to be a promising remedy, though we do not yet know as much of it as we do of tobacco. Several cases are on record where recovery has ensued under its use. In the following there can be no question that it was positively beneficial.

Case 2.—Mr. Ashdown admitted October 3rd a man, æt. 33, into the Northampton Infirmary, who had received a scalp wound just three weeks before. He had scarcely been able to swallow any food for the last 3 or 4 days, every attempt to do so bringing on a fresh paroxysm of pain. He was bled to a pint October 2nd. On the following day he began to take Calabar bean, gr. $\frac{1}{6}$ of the extract in ʒj of water every half hour, and was supported with strong beef-tea, milk, port wine 8 oz., and brandy 4 oz. October 5th.—The dose of the remedy and the amount of support was doubled, as he was much worse, violent paroxysms coming on every few minutes, and the muscles appearing even more rigid than previously. October 6th.—State same. The Calabar bean was now ordered to be administered by subcutaneous injection only, gr. $\frac{1}{3}$ of the extract dissolved in ♏xviij of water being the dose every two hours. The effect of the first injection was very marked. In about 5 minutes the legs, which had previously been perfectly rigid and immoveable, became flaccid and freely moveable by the patient, the abdominal muscles became less tense, and the arching of the spine disappeared. The pupils also contracted, and the pulse sank to 82. The effects lasted 2 or 3 hours, and all the symptoms then reappeared. October 9th.—The injections have been continued every 2 hours, and their influence in preventing the muscular rigidity and spasm remained unabated; the only muscles not perfectly relaxed were those of the abdomen and back. The pupils were much contracted, and the patient had at times been very delirious. As the injections occasioned much pain and inflammation in the areolar tissue, and the solution was found to be acid, a few drops of liquor potassæ were added to it. This corrected the above-mentioned ill-effects. The injections were continued till October 15th (except for 7 hours on 10th, and then the muscles soon became as rigid as ever), when the severity of the disease was evidently subsiding, and were then replaced by suppositories of the same extract containing gr. $\frac{1}{4}$ to be applied every two hours. Morphia was given with benefit every night. He took 12 eggs and 2 bottles of sherry in 24 hours. By November 1st the malady was at an end. ('Brit. Med. Jour.,' 1868, March 21st.) The value of the drug in this case cannot well be questioned; it acted very much as the tobacco in a former, controlling and keeping under the urgent and dangerous symptoms until the disease declined. If it did not cure it probably saved life. In neutralizing an acid solution care must, of course, be taken not to add an excess of alkali, which might decompose the active principle.

The following history recorded by Dr. Mac Laurin, of Greenwich Hospital ('Edin. Med. Journ.,' 1865, October), though not one of Tetanus, is evidently much allied to it, and seems, as he anticipates, well suited to throw light on some points of nervous pathology and therapeutics.

Case 3.—D. R—, æt. 46, seaman, was admitted December 1st, 1864, under the care of Dr. Smart. He stated that he had suffered for about 12 months from fits; that the attacks were now becoming milder; that about 6 months ago he had become paralysed on the left side, but that he had now regained nearly perfect use of his leg and arm. December 3rd.—A fit occurs several times during the day; consciousness is not lost; the limbs suddenly become rigid, the head is drawn towards the left shoulder, the patient recovers in a few moments. About 10 fits occurred during the night of 4th. He was ordered a mixture of Potassii Bromidi gr. xv + Potassii Iodidi gr. iij ex aquâ *ter die.* Under this treatment he improved a little, and left the infirmary February 28th. As the fits recurred with great violence he was readmitted March 10th. There was now considerable loss of power in the left arm and leg. The fits recurred 6 or 7 times a day. In each paroxysm the limbs became straight and rigid, the head was drawn to the left shoulder, and there was twitching of the left eyelid, cheek, and angle of the mouth. The eyes were turned upwards and to the left. There was no stoppage of the respiration, nor foaming at the mouth. The colour of the face was only very slightly heightened. There was no loss of consciousness, although the power of speech was suspended by the spasm. The paroxysms lasted about half a minute. Bromide of potassium in 20 grain doses, and valerianate of zinc were quite inefficacious. As he had had tapeworm 7 years previously he was given male fern and turpentine, but without any good result. On the supposition that the disease might depend upon syphilis the patient was treated with mercury and iodide of potassium, but no success followed. Lastly he took belladonna till its effects on the throat and iris were very marked; instead, however, of being better, he got much worse. He lost all power over the left arm and leg, the hand and foot were turned in at the wrist and ankle. There was a constant twitching of the left side of the face, involving the eye and the angle of the mouth. Every 6 or 8 minutes he was thrown into a state of tonic spasm in the manner already described. The slightest external irritation brought on a fit, even touching or speaking to him had this effect. Each fit of tetanic rigidity lasted 1 or 1½ minute. He slept very little, and could only swallow liquid food. He was rapidly losing intelligence. He was quite unable to feed himself or perform any of the offices of nature without assistance. While he was in this condition April 20th, Calabar bean was commenced, ♏j of a solution equal to gr. iv of the bean *ter die,* after smaller doses had been given at first. The therapeutical effects of the remedy were exceedingly gradual, but quite uninterrupted in their course, and in the highest degree satisfactory. For the first 2 days no improvement was noticed, except that the patient slept rather better at night. After this the intervals of the attacks were a little longer, and the fits themselves less severe. The intellect became clearer, and he was able to read. By April 29th he could be spoken to without a fit coming on. By and by he could be fed or lifted out of bed without recurrence of spasm. Simultaneously with the diminution of tonic spasm there was lessening of twitching, and some return of power in the left arm and leg. On May 10th he began to take solid food, and assist himself, though with the aid of a crutch. After this date he had no recurrence of fits. By May 17th he could walk about with a stick. On May 21st he gave up his stick, but still had some weakness of the left leg and arm. On May 27th he was discharged, and has gone on getting better since. Dr. MacLaurin observes that there were three kinds of functional disorder in this patient. (1) Violent tonic spasm of the voluntary muscles, dependent evidently on heightened reflex action (reflex hyperexcitability). From this the respiratory muscles were exempt. (2) Loss of voluntary power over the left arm and leg. In the intervals of the fits the patient could move his right extremities, but not his left, which remained immovable and flaccid. During the fit, however, the limbs of both sides became equally rigid. The tendency of the head and eyes to move towards the left may be mentioned in connection with the paralysis of the left limbs. (3) Obscuration of the intelligence. The author regards the reflex hyperexcitability as the primary and essential feature of the disease, to which the other derangements, motor and intellectual paralysis, were secondary and consequent. He locates the disorder in the medulla oblongata on account of the general prevalence of the convulsions. The points in which this case differs from one of Tetanus are the absence of permanent rigidity, of trismus, of any spasm of the diaphragm, and of any tendency to spontaneous termination. It resembles Tetanus in the paroxysms of rigidity of the voluntary muscles, in the difficulty of swallowing, in the extreme spinal hyperexcitability, and in the loss of sleep. To Epilepsy it bears a resemblance in the bowing of the head to one side, in the paroxysmal character of the convulsions, the brevity of the fits, in the hemiplegia of the intervals, and the weakening of the intellect. The points which seem to me of special interest are:—(1) The illustration it affords of the near relation of paralysis to spasm, both being evidently co-results of the same cause; (2) The exemption of one nervous centre, or group of nervous centres, viz., those of respiration, from the morbid action, while others closely adjacent were engaged. This seems to imply a greater amount of resisting power in the former. (3) The injurious effect of Belladonna, which might reasonably have been expected to counteract the hyperexcitability, as it certainly seems to do, in various similar conditions. This shows how varying is the quality of morbid nervous action, how much depends on idiosyncrasy. (4) The probable utility of Calabar bean in conditions characterised by reflex hyper-excitability.

The next class of remedies for examination is that of Sedatives. The most important of these are Opium, Indian hemp, Belladonna, and Chloroform or Ether. Hasse writes judiciously respecting the first, that the many recorded instances of its failure prove that it cannot be regarded as the special curative means of Tetanus, but it would be carrying scepticism too far to deny its beneficial influence. I have seen, he says, in a case which ended favorably the symptoms become aggravated every time that I attempted to leave off the Opium, while a return to the remedy was immediately followed by improvement. Even in fatal cases it has afforded evident relief, though temporary. He reckons it, therefore, as a very valuable palliative means by which the patient's sufferings may be lessened, and time gained for a gradual subsidence of the disorder. There can be no doubt that the tolerance of opium by the system is largely increased in this disease, as well as that in some instances very large amounts of the drug have been ingested without being absorbed. On both these grounds the mode of administration by subcutaneous injection seems to be preferable to that by the mouth or by enema. Mr. Lampey considers that opium smoking has advantages, for while it produces profound sleep and composure, it does not exercise an immediate injurious influence on the digestive system. He relates a case of traumatic Tetanus in which he thinks this medication greatly aided the cure. Dr. Latham (Curling, p. 163) strongly recommends the Pulv. Ipecac. Co., and relates several cases in which it appears to have been given with success, in doses of 10 grains every 2 or 4 hours. That the operation of Opium may be much promoted by combining it with a relaxant as Ipecacuanha or Antimony can hardly be questioned, and the success of such combinations in Delirium affords ground for believing that they may be serviceable in the analogous spinal affection. On the other hand, in cases of a different quality it may be better to combine the opium with stimulants, which some are inclined to regard as no mean remedies by themselves. Of this procedure the following is a good example.

Case 4.—A soldier, æt. 29, who had formerly been a farmer, received a flesh wound at the battle of Chancellorsville in the recent American war. Tetanus set in 6 days after admission into hospital, and treatment was commenced May 15th. He had Morph. Sulphat. gr. j at first, half an hour later Tr. Opii ʒij in half a pint of Brandy, a few minutes after Tr. Opii ʒij in 4 oz. of Brandy. A paroxysm ensuing just before this last dose was the severest, and the longest he had, but gradually relaxation was complete, and he sank into a deep sleep lasting 13 hours. On waking he voided 2 pints of urine. Paroxysms again threatened, so ʒiij of Tr. Opii were given in 4 oz. of Brandy, and he slept soundly for 4 hours. Subsequently gr. ij of Extr. Bellad. were given in ℥j of water. By 8 p.m. the patient had rallied, his bowels were moved freely, and he passed urine profusely. Symptoms of cramp again appearing 2 grains of Sulphate of Morphia were given in 4 oz. of Brandy. The patient became thoroughly narcotized, but his lethargy passed off in the course of 6 hours, and subsequently he steadily improved. After May 17th he had no symptoms of a paroxysm. ('Lancet,' 1864, Vol. I, p. 267.) This patient took about 40 grains of opium or its equivalent in 2 days, and there can be no doubt that the drug was absorbed, and affected the system. Neither can it be doubted that the disease was beneficially influenced, or that the large doses administered would have proved fatal but for the resisting power conferred by the morbid action. I am of course aware that much larger quantities have been given, and in fluid enemata, yet with very trivial effects. This failure, however, does not seem to me at all to disprove the possibility of a better result in other instances, but rather suggests to me the importance of studying the cases more closely to determine, if possible, the characteristics of that condition to which Opium with stimulants is appropriate.

Hasse states that Belladonna has been warmly recommended by many writers. Their experience is conformable to Brown-Séquard's view of the action of the drug, viz. that it diminishes the reflex activity of the cord by contracting its blood-vessels, and so rendering it anæmic. Though I cannot help doubting that such is its *modus operandi*, and am more disposed to look on it as a direct sedative to the disorderly acting nerve-cells, I am quite of opinion that it may render good service in suitable cases. Mr. Oliver, of Redcar, relates the following history of a patient under his care, in which we can hardly refuse to admit that Belladonna manifested healing power.

Case 5.—A healthy-looking lad, æt. 14, was seized with lockjaw and severe pain in the cervical and dorsal regions, with fever, a few days after jumping from a coal waggon. On my visit (4th day of symptoms) I noted well-marked risus sardonicus, incisors separable less than half an inch, masseters rigid, as also the sterno-mastoids and muscles of the back, abdomen flat and hard, cervical and dorsal vertebræ arched forwards, legs and feet rigidly extended, tenderness along spine, arms free from tetanic symptoms, paroxysms of severe general spasm every few minutes, pulse 140, sleeplessness. He was ordered Atropiæ gr. $\frac{1}{16}$ 3*tis horis*, and Linim. Bellad. to be well rubbed over the spine and rigid muscles 6*tis horis*. Within 24 hours the physiological action of atropia showed itself; then the clonic spasms became less severe and of shorter duration; and the tonic rigidity gave way first in the legs and neck; then in the back; and last of all in the abdomen and masseters. On the 6th day of the treatment rigidity of the masseters alone remained. He was kept under the influence of atropia for 3 weeks. He then quickly and completely recovered his usual health under steel and quinine. ('Brit. Med. Jour.,' 1868, August 22nd.) That this was really a case of Tetanus, and a severe one too, cannot, I think, be doubted. The symptoms were not those of spinal meningitis, although the tenderness of the spine may seem to some to countenance this idea. The acuteness of the attack is evidenced by its early supervention after the injury, and the deprivation of sleep. On the whole, though we cannot affirm that recovery might not have ensued without the atropia, there seems to me no room for scepticism that it contributed materially to the early subsidence of a very grave malady.

Indian hemp seems to have been useful in certain instances either alone or in conjunction with other remedies. Its efficacy, however, is probably inferior to that of several other agents, but it has, as well as Belladonna, the compensating advantage of being safer. Its intoxicating effects are certainly disagreeable, and sometimes alarming enough to the patient or his friends, but I never heard of an instance where the condition was one of real danger. Dr. Fraser ('Med. Times and Gaz.,' 1863, Feb. 7th) records a case of trismus algidus resulting from exposure to wet and cold, and becoming so severe that the jaws could only be separated by considerable force. He was treated with Extr. Cannab. Ind., commencing with gr. $\frac{1}{4}$ every hour, and increasing the dose to gr. iij every hour. This caused intoxication in about 12 hours, which soon disappeared on leaving off the drug. Altogether 115 grains were taken during 7 days of treatment, after which he left the hospital of his own accord feeling perfectly well. He could then separate the jaws about an inch. Dr. Fraser says, "I may safely aver that the influence of the hemp was beneficial, for no increase of spasm took place after its administration; indeed the treatment evidently arrested the threatened spread to the muscles of the trunk," indicated by the existence on the second day of stiffness of the muscles of the neck. A similar attack, but less severe, had occurred a year before from the same cause, but ceased in 3 weeks spontaneously. The present one did not last so long. Dr. Lewis ('Edin. Med. Jour.,' Aug., 1859) reports a case of traumatic Tetanus in a lad, æt. 13, which terminated favorably under 4 grains of Indian hemp every 3 hours, the first dose being preceded by a full free bleeding. The patient was decidedly becoming worse up to about the 4th day, when he was bled, and from this time he continued to improve steadily. The Extr. Cannab. Ind. was continued at the same rate for 3 days, and then given less frequently; it does not seem to have produced any toxic effects, which is remarkable, considering the large amount administered. Dr. Lewis attributes the boy's recovery chiefly to the V.S., though he does not deny that the calomel purgatives and narcotics were also beneficial. Skues treated a girl, æt. 9, suffering under traumatic Tetanus with Indian hemp, nourishing soups and wine. She took from 4 to 18 grains daily of the extract, and was kept in a continual state of narcotism. The symptoms were tolerably severe, the pulse feeble and rapid. The disease did not commence until 4 weeks after the injury, when the wound was quite healed. It gradually declined in severity under the means employed, and the patient was convalescent on the 13th day.

Dr. Famage treated 2 cases of Idiopathic Tetanus by Tr. Cannabis Indic. ♏xxx *2dis horis*, occasional doses of calomel, beef tea and wine, with counter-irritation to the spine. The first case was that of a man, æt. 32, who died on the 8th day actually, and was all but dead on the 5th. His heart's action and respiration had ceased, but he was restored by Marshall Hall's method of reanimation. He had improved much during the last 2 or 3 days before death, which was occasioned by a violent recurrence of spasm. The second case was that of a boy, æt. 12, who when raised up was as rigid as a block of wood. He had complete trismus, all his medicine and nourishment were sucked through an opening between the teeth with a small tube. He recovered in about 7 days. ('Lancet,' 1860, Vol. II, p. 263.)

Curare, or woorara, has been employed of late years in a good many instances. Demme ('Schweiz, Ztschr. fur Heilk.' II, 356) states that hitherto (1863) there have been 22 cases treated by this means, of which 8 have recovered. Even in the fatal cases, at least in some, calmness and muscular relaxation followed its use. Gherini records one case which was treated successfully by subcutaneous injection of curare. The treatment commenced on the 5th day, and the patient was convalescent on the 17th. In all 47 grains were injected dissolved in 2 oz. of water. The effect of the remedy was to cause relaxation of the muscles, especially when injected into their tissue, also copious diuresis and diaphoresis, light and refreshing sleep, keen hunger and thirst. Busch reports his experience of its effects in Tetanus occurring after the battle of Koniggratz. The disease did not appear until the second week after the engagement. Before Curare could be procured 9 patients died, a tenth was saved by the hypodermic injection of Morphia gr. $\frac{1}{4}$ 2*dis horis*. The remaining 11 cases were treated by curare. Five of them died, one, however, of pyæmia. Improvement took place in all. The duration of the disease in the successful cases varied from 7 days to four weeks. Busch ascribes its good effects on the one hand to its preventing the cramp-like muscular contractions, which react injuriously on the spinal cord, intensifying its reflex excitability, on the other, to the avoidance of the excessive increase of temperature which must necessarily result from the powerful action of the muscles. He prefers administering the remedy by subcutaneous injection to giving it by the mouth, as in the latter case its operation is very uncertain. The dose varies according to the purity of the preparation from gr. $\frac{1}{50}$ to gr. $\frac{3}{10}$. It seems clear that this drug has no claim to do more than neutralise some of the more formidable and injurious effects of Tetanus, though in this respect it may be of great value; and that we cannot yet rank it as a preferable agent to some of those we have reviewed. In very acute cases it fails as all others do.

With regard to the anæsthetics, Chloroform and Ether, Thamhayn ('Schmidt's Jahrb.,' Vol. 112, p. 210) reports that they certainly afford considerable temporary relief. The pulse falls to its normal frequency, and the breathing becomes regular. The spasms and the concomitant pains vanish, as well as the distressed expression of the countenance, and tranquil sleep ensues. The external appearance of convalescence is complete, but all the while the disease is powerfully and insidiously advancing onwards towards its fatal termination. Its course is not delayed, nor its intensity diminished. As soon as the remedy is omitted the whole array of fatal symptoms reappears. Often the intensity of the disease and of the pain is proportional to the time during which both have been suppressed by the anæsthetic. Faurel's report is in a much more favorable strain; he states that he has procured recovery in 29 cases by chloroform or ether, 11 of them being idiopathic, and 18 traumatic. He thinks the chief cause of failure lies in having recourse too late to these remedies. The possibility of restoring the power of swallowing by these means is certainly a great gain. The conclusions arrived at in a report on 43 cases in the 'Med. Times and Gaz.,' June 17th, 1854, are nearly to the same effect as Thamhayn's. The writer states that the continuous administration of chloroform over long periods of time is not to be recommended, since the patient sinks as fast at least, if not faster, than when the disease is allowed to display itself. Dr. Sansom is disposed to "prefer ether to chloroform in all except the early treatment of these cases. Ether produces more muscular relaxation with less nervous depression."

Acupuncturation is a remedy seldom resorted to, I believe, in Tetanus. Dr. Grant, however, has put on record an interesting case in which its beneficial effects were rapid and marked.

Case 6.—The patient was a man, æt. 37, in the enjoyment of fair general health, who received an injury from a saw over the right frontal eminence. On the 8th day after tetanus had commenced, and by the 13th the symptoms were severe. Four days later he was much worse, his expression betrayed great suffering, spasms of the arms and legs were frequent, and articulation and swallowing were very difficult. Ice to the spine, and Indian hemp gr. iij *2dis horis* had failed. At this stage 3 needles (No. 9) were inserted into the muscles of the neck on either side, and within 1 inch of the spinous processes of the cervical vertebræ. The intervals between the needles were about an inch. Prior to this operation the muscles of the neck were firm and rigid, so much so that the insertion of the needles was difficult, but caused little pain. Immediate relief was experienced, and one minute later, when the needles were removed, he was able to move his head laterally with considerable ease, owing to the most marked reduction of the muscular tension. The needles were removed with much greater ease than they were inserted. The power of deglutition was also increased. After this the needles were inserted each day into the rigid muscles of the cervical, dorsal, and lumbar region. Four days later he had very little pain anywhere, his countenance was cheerful, the mouth could be opened fully two inches, and he swallowed easily. Paroxysms were slight, and occurred at long intervals. From this date he continued to improve, the rigidity of the various muscles rapidly giving way under the treatment. In less than 3 weeks he returned home almost perfectly well. ('Med. Times and Gaz.,' 1865, Vol. II, p. 495.)

Tonics and Stimulants are remedies in Tetanus which have both past and present experience in their favour. As subsidiary means intended to sustain the powers of the system depressed either by the remedies employed, or by the severity of the disease, they are rated very highly by Mr. Travers and Mr. Curling. The former observes that "patients have been lost in Tetanus from want of proper nourishment and cordials oftener than from want of proper medicine." The reporters of the 'Med. Times and Gaz.,' April 6, 1861, recommend the free use of quinine in all except the most acute cases. Two cases of traumatic Tetanus are recorded in the same journal, November 4th, 1865, in which severe symptoms yielded to gr. v of quinine *2dis horis,* combined in the second with ℞30 Tr. Ferri Muriat. In a case communicated to me by my colleague Mr. Gascoyen, large doses of quinine were not beneficial, but much comfort was derived from full doses of Tr. Opii.

In regions where malarious fever is prevalent the disorder may sometimes assume the guise of tetanus, and quinine will then be specially requisite. I have before me the letter of an Indian officer, in which he says, I am sure I have seen at least two cases of idiopathic tetanus, terminating fatally, where the Tetanus was simply an expression of intense malarious poisoning. I did not so read the cases then, and so I lost them both. I believe *now* that quinine would have cured both cases. The following history ('Lancet,' 1862, September 27th) is interesting as to this point.

Case 7.—Mrs. S—, æt. 22, had had "dead ague" a little before April, and expected her second confinement in July. At the age of 14 she had fits, brought on by excessive fright, in which she had bitten her tongue. On April 19th she had a severe seizure of emprosthotonos, the limbs and trunk being in a state of rigid spasm, and the hands firmly clenched. This lasted half an hour, and then changed to opisthotonos, which lasted 45 minutes. Severe congestive head pain followed the attack. She was purged with calomel, took quinine, and the next attack was much modified, as well as the consequent congestive headache. One or two other attacks occurred from neglecting precautions, but by taking quinine and attention from time to time, future ones were averted. She went her full time, and was delivered of a living child. Before the first attack she had threatenings on 2 or 3 consecutive days, and always at the same hour. The district is malarious.

MacAuliffe praises Ammonia in large doses as a valuable remedy, following in the steps of Fournier-Pescay, and others. In one of his cases, after the administration of Ammonia, the symptoms were considerably mitigated, but on the 8th day they recurred again with severity immediately after the drug had been left off. Its employment was resumed at the rate of about 240 grains in the 24 hours, and the disorder again gave way. M. Francois (Curling) witnessed

4 cases of Traumatic, and 1 of idiopathic, treated successfully with Ammonia. The doses are not mentioned. The value of alcoholic liquors in the treatment of Tetanus is generally admitted, but Dr. Radcliffe suggests that a bolder administration of them might be desirable. The system, he says, is altogether insensible to the action of wine in ordinary doses. So it is also in low fever prostration, and that produced by the venom of snakes; and in these conditions we know that an amount of brandy or other spirit may be given with the most decided advantage which would prove highly toxic to a person in ordinary health. In most cases, I think, stimulants are requisite, either to sustain failing power, or to render pain more tolerable, or to aid in annulling that state of nervous system which causes the spasms. For this latter purpose they should not be employed, I think, indiscriminately. In many cases depressants and sedatives should be used first; but if these fail, or act more injuriously on the general system than beneficially on the morbid action, or if early asthenia forbids their employment, I would give full play to ammonia and alcohol. Quantities must not be so much measured as effects estimated. If the pulse became slower, and the temperature (supposing it febrile) fell, or remained normal, perseverance with these agents would be decidedly indicated. A good example of the beneficial effects of wine in large quantities is the following, related by Dr. Currie, which is often briefly alluded to, but which seems to me interesting enough to cite at more length.

Case 8.—A labouring man contracted traumatic tetanus, which, in spite of remedies, made very rapid progress. The jaw was not only rigidly contracted, but the spasms had extended to the neck and back, the pain under the ensiform cartilage was most acute, and twice or thrice in every hour he was seized with general convulsions, each of which lasted half a minute. The patient was, however, a man of a vigorous mind, and in his perfect senses, and his danger was not concealed from him. Death, he was told, must be the inevitable consequence unless he swallowed wine in large quantity, but this we verily believed would save him. At first bark was infused in the wine, but he could not swallow the mixture, and therefore we trusted to wine alone. It was wonderful to see the exertions which this poor fellow made. If the liquid was offered to him at an improper time, the effort of deglutition brought on a general convulsion; nay, a general convulsion was the consequence of advancing it at such a time towards his head. But, watching the remission of the spasms, he was able to swallow a tablespoonful or more at once, he himself giving the signal when the wine should be administered. In this way through the opening made by the lapping of the upper jaw over the under one, he drew up and swallowed a quart of port wine in the course of 2 hours; at the end of which time he thought himself refreshed, and was encouraged to proceed. At the end of 24 hours he had finished his third bottle, and at this time it was evident that the downhill progress of the disease was checked. Though the pain under the ensiform cartilage was little abated, yet he felt himself more able to bear it, and the general convulsions were certainly less frequent and severe. We continued our plan with patience and vigour; but for a long time life and death seemed to hang in equal scales. It was not until he had been 42 days under this treatment that his safety could be ascertained; and during this time he swallowed 110 bottles of port wine. Though the wine was given in such quantity, yet it never produced any symptoms of ebriety; it soothed the irritation of his nerves, and comforted his mind, and, without increasing the frequency of his pulse, it augmented his strength. Every night he took from 60 to 120 drops of Tr. Opii, and, with the wine, this small dose seemed to have a more composing effect than thrice the quantity taken before he began it. Ultimately he recovered, though for years after his features retained the indelible impression of the disease.

Warmth to the surface, either by the warm bath, or the vapour bath, or in other modes, would seem to be naturally suggested by the knowledge that the disease is often induced by exposure to cold. During the existence of the disease in force, the warm bath does not seem to have been at all successful, but to have even proved the immediate cause of death in some instances. In chronic cases, however, and those where some traces of the morbid action have persisted for years, warm bathing has been of service. Mr. Curling cites a case where the muscles possessed, for many years after the spasms had been removed, a degree of rigidity, which was increased by the slightest irregularity in diet, or variation in the atmosphere, and was accompanied by acute pain. Here great relief was afforded by warm baths and the use of musk.

There is very little evidence, indeed, that the vapour bath has rendered any important service. From its effects on persons not suffering from tetanus, I fear that it would enfeeble the heart seriously before it relaxed the general spasm. Constantin James' experience is very decisive as to the greater difficulty of enduring exposure to moist than to dry heat. In the vapour baths of Nero he was almost suffocated in a temperature of 112°, while in those of Testaccio, in which the air was dry, he was but little discomforted by a temperature of 176°. Probably the best mode of applying heat would be to advise a prolonged stay (perhaps for days) in a well-appointed Turkish bath. This ought to be very feasible in a good hospital, such as that in Vienna, where Hebra kept cases of skin disease for weeks in a warm bath. Other treatment might, of course, be pursued at the same time.

The application of cold in the form of affusion or of the plunge bath is undoubtedly a potent means, but one which needs to be employed discriminately, lest it destroy life as well as the disease. This actually occurred in one case mentioned by Mr. Morgan. In the first, treated by Dr. Currie with the cold plunge, the result at first was sufficiently alarming, a general tremor was the only indication of life, the pulse and respiration were nearly, if not entirely, suspended. Warmth and friction, however, restored the vital functions, the patient fell into a quiet and profound sleep, and when he awoke at the end of more than 2 hours the malady was essentially at an end, although but a short time before his condition appeared so desperate that, had not medical effort been wholly untrammelled by "the prejudices of ignorance, or the weakness of affection," recovery was utterly improbable. The whole history of the case is well worth reading, and leaves no doubt on my mind that the remedy, though a hazardous one, was strikingly successful. It is, I fear, hardly possible to employ this or any other powerful agent in the treatment of serious disease without some risk of injurious consequences; but if we see that the patient is otherwise losing ground and no better means can be found, we ought not to shrink from the responsibility of proposing a remedy which may avert the approaching doom, though it may possibly precipitate it. This is, in fact, what is done continually with regard to ovariotomy and other like cases. Under such circumstances it is of course necessary that we acquaint ourselves thoroughly with the conditions which forbid or justify the employment of the contemplated remedy. These are as regards cold affusion or immersion well and clearly stated by Dr. Currie (*vide* p. 17, vol. i. 'Med. Reports.') It is true he is speaking of fever, but his directions are, I think, easily applied to Tetanus. Cold affusion, he says, may "be safely used at any time of the day, *when there is no sense of chilliness present, when the heat of the surface is steadily above the natural, and when there is no general or profuse sensible perspiration.* These particulars are of the utmost importance." If we refer to the case of Alexander the Great, which he cites at p. 116, and another which he gives at p. 124, we shall see that injurious consequences are prone to ensue wherever the system is much exhausted, the chief danger probably being that of the heart's being arrested by an inhibitory impression conveyed to it through the cutaneous nerves, against which it is too weak to react. A certain amount of vigour, especially in the circulation, is essential to render the procedure safe. Applying this to Tetanus, we should not advise cold affusion or immersion whenever our patient was much exhausted by the length or severity of his sufferings, or was prone to syncope, or had a weakly acting heart, or a clammy cool skin. These will be the general rules; but cases may well occur which, in some respects, appear unfit for cold affusion, and which yet might be benefited by its modified application, especially if guarded by the previous administration of stimulants. Such an instance we may reckon the following, which is related by Mr. Presham ('Lancet,' 1846, Vol. I). A boy, æt. 11, after 3 weeks' treatment was rapidly sinking from the effects of Tetanus. He was perfectly restored in 10 days by wet packing, followed by cold baths and by cold douches from a height of 20 feet, with a stream of 1½ inch diameter. Mr. Curling says, "with the exception of tobacco, I know of no remedy so well adapted to produce an impression on the nervous system of power adequate to control the severe spasms of this disease, as cold affusion." Stein ('Schmidt's Jahrb.,' vol. cxxi, p. 42) relates a case in which the same kind of treatment, minus the douches, proved serviceable. A boy, æt. 11, bathed in a cold stream while heated. Trismus commenced the next day, and the disease subsequently involved the extremities and the trunk. The temperature between 4 and 6 p.m. averaged 101° F.; the pulse was only accelerated at first. Tartar emetic and morphia were of no avail, but packing in the cold wet sheet always diminished the reflex excitability, and the spasmodic paroxysms. It was employed continuously at first, and subsequently as the disorder declined at intervals. In 4 weeks there was but little trace of Tetanus, and in 6 weeks the boy had quite recovered.

The case recorded by Dr. Macgregor ('Med.-Chir. Trans.,' Vol. VI) is usually cited as an instance of the beneficial effect of cold. The patient had unusually severe Tetanus, but, after being conveyed during 16 hours on a bullock car, at first drenched with rain, and afterwards almost frozen in ascending a snow-covered mountain, he was completely freed from his malady. The result is the more remarkable, as the very same influences have often produced the malady.

Another mode of employing cold is the application of ice to the spine. The results of this procedure are reported to be very favorable by Dr. Carpenter, N. Y., who states that he has cured by this means 15 cases out of 16. In the fatal case death seems to have been the result rather of cerebral meningitis than of tetanus. He gives the particulars of one interesting case where the tetanus, which was very severe, was complicated with paraplegia, the result, it would seem, of a fall on his back on a ridge in the road when he was thrown from a horse. The paralysis continued 12 days longer than the tetanic spasms, which ceased after 7 days of treatment, the injury having been received 3 days before. The record leaves no doubt that the case was truly one of tetanus, and not spinal meningitis; there was complete closure of the jaws; the play of the chest was so impeded that the face and lips were constantly of a dark mahogany colour, or even darker, and both swallowing and articulation for 2 or 3 days were impossible. The paralysis seems to have disappeared too speedily and completely to make it probable that it depended on myelitis or meningitis. As it came on simultaneously with the tetanus, and not within at least 2 days of the injury, there seems more ground for referring it to the traumatic irritation which produced the tetanus rather than to concussion of the cord or any injury received in the fall. The patient, in fact, walked 3 miles on the 4th day after the accident. In this case broken ice was applied in bladders to the head and whole length of the spine; and the bowels were moved by assafœtida injections twice a day. These measures, with Dover's powder gr. xij *2dis*, *4tis*, vel *6tis horis*, and, in the later stage of the case, blisters to the spine were continued until the 19th day, when the recovery was complete. ('N. Y. J. of Med.,' January, 1860, p. 133.) Dr. Falconer ('B. M. J.,' 1864, April 6th) records a case of tetanus induced by a contusion, which was treated by the continuous application of ice to the spine, and terminated favorably. No rapid improvement ensued after this treatment was commenced on the 18th day of the illness, and it is not possible to say how far the remedy promoted the recovery.

The possibility of bringing the voluntary motor impulses to counteract and control those of the cord seems to be affirmed by a case of Cruveilhier's cited by Romberg (Vol. II, p. 116, 'Syd. Soc. Translat.'). A young man, æt. 20, was in imminent danger on the 10th day of traumatic tetanus, being affected with spasmodic convulsions of the respiratory muscles especially of the diaphragm. Assuming that the muscle could not obey two stimuli at the same time, and that the more powerful would obtain the mastery over the weaker, Cruveilhier advised the patient to make deep inhalations in rapid rhythmical order, and in order to facilitate these movements he indicated the time by alternately elevating and lowering his arm. The result exceeded all expectation; the convulsive jerks of the muscles of the trunk and the muscles of respiration, which previously had recurred every minute, did not return for half an hour, when the patient, entirely exhausted, had ceased from his rhythmical inhalations. The experiment was repeated with the same effect. At last the patient went to sleep and slept for 2 hours. On the following day the improvement was very marked; the convulsive movements only recurred at long intervals, and disappeared as soon as the patient had recourse to the rhythmical inhalations. This also occurred on the following days, and on the 26th recovery was complete. It is very possible that in some instances Cruveilhier's procedure may be followed with good effect. It is quite analogous to the regulated gymnastic exercises which have been found very useful in chorea. In the worst cases, however, for which we most need a remedy, it is to be feared that the hyper-excitability of the lower centres could not be thus controlled. The principle on which such treatment really rests, I believe, is that of diversion of nerve-force, noticed at p. 17. Exertion of one nerve-centre seems to lessen the amount of force generated in others.

The hopes which were raised some years ago of the beneficial effects of galvanism have not been confirmed. In the case related by Matteuci amendment in the symptoms took place under the influence of a continuous current sent along the spine, but it was only temporary; and though amelioration again ensued when a larger number of elements was employed the salutary effects gradually diminished and at last ceased entirely ('Med. Times and Gazette,' 1864, Feb. 6th). In a youth, æt. 15, suffering with idiopathic tetanus, I tried the effect of a large Pulvermacher's chain to the spine, together with the application of ice, but he died in a few hours. We ought not, however, to lay aside this means as yet, for further trial may give better results. It would be desirable also to try the effect of static electricity, which Dr. Addison found very serviceable in some severe cases of chorea.

After this review of clinical experience in tetanus I cannot but conclude—(1) That, making every allowance for the natural tendency of the disease to subside, certain modes of treatment may exert a most beneficial influence upon its manifestations, even to the extent of making the difference between life and death. The cases related seem to me well nigh to prove this. (2) That no one general mode of treatment is to be thought of. The quality of the morbid action is varying, and the condition of our patients is very various too. One man with a vigorous circulation may bear a depressing remedy, and find it eminently beneficial by its sedative influence on his nervous system, while to another whose heart is weak from degenerated fibre or other cause the same remedy may prove mortal. In one patient the morbid process may depend on nerve disorder alone, in another on nerve disorder complicated with or intensified by increased intra-vascular pressure. Idiosyncrasies contribute, I believe, largely to render the effects of narcotics uncertain, and to make it impossible to lay down general rules for their administration. Further, I entirely believe that different remedies may be required at different times and places, according to the medical constitution prevailing. Trousseau says ('Clinique Med.,' Vol. II, p. 186) this great law has to be referred to continually (son application est de chaque instant). The selection of the remedy must be determined by our appreciation of the patient's strength, of his temperament, and by our knowledge of his idiosyncrasies; but after all we must be mainly guided by the results, and no treatment must be persisted in which has an injurious effect, or does not at least mitigate to some extent the intensity of the disorder. As to the objection which some entertain against 'lowering remedies,' as they are called, I conceive that it rests on a misconception of the intention with which such drugs are given. It is not desired to weaken the general power of the frame, but to lessen the intensity of certain actions which are destroying life by their violence. Remedies which accomplish this object are the very reverse of destructive, and it is only when they can be so used as to attain a much larger amount of good in the one way than of bad in the other that their use is permissible. This may sometimes be secured by the simultaneous administration of stimulants, where otherwise it would be impracticable. It should be borne in mind that if life can be maintained the malady will sooner or later come to an end, like a fever, and, therefore, if our remedies only avail in lessening the severity of the symptoms so that they are no longer in themselves dangerous, we may reckon on ultimate success. I am well aware how great is the shortcoming in not being able to point out the indications which ought to direct us in the choice of the various means I have noticed, but I fear that, except to a limited extent, it is impossible. A hard pulse, and hardy frame with severe symptoms threatening death by apnœa, would be my warrant for using depressants of which tobacco would probably be the best. Aconite might be more suitable to cases of great intensity, but of less decidedly sthenic character. Calabar bean might be used in a greater number of cases than either tobacco or aconite, as being less liable to cause dangerous prostration; it may be reckoned perhaps as much a sedative as a depressant. Cold affusion or the cold douche to the spine seem to belong to the class of depressants, or at least to require a certain amount of resisting power in the system, of which the practitioner must judge. It is very possible that the sphygmograph might afford aid in cases where we were doubtful as to the propriety of using depressants. A tracing like that in typhoid fever would forbid, while a normal tracing would go far to sanction their employment. If under their influence the pulse became more and more feeble and frequent, and the first sound of the heart more weak, they would almost certainly be contra-indicated.

The class of sedatives is appropriate to cases where the symptoms are very severe, but the general power is somewhat weak, and the danger is as much or more from asthenia than from apnœa. Such remedies might come into play happily after the edge of the disorder had been taken off by depressants, but in a great many cases they might be used from the first. Opium should be regarded as the most stimulant of these, too much so indeed to make it suitable to states of great hyper-excitability. Wet packing belongs chiefly, I think, to this class, and may well be combined with the use of such remedies.

Tonics and Stimulants find their opportunity when the above remedies have failed, or to obviate the injurious effects of some, and in that large class of persons in whom the organs are functionally as well as organically more or less unsound.

The above attempt at grouping the cases is vague and imperfect enough, but may at least serve as a protest against the too prevalent custom of massing all the cases together, and expecting to find some remedy which shall be available for all alike. We have no more right to think thus of Tetanus than we have of Delirium.

LEEDS SCHOOL OF MEDICINE

CHAPTER XIII.

TETANILLA.

This disorder, if I may judge by my own experience and the records contained in our current publications, is very rare in this country. In France, however, it has attracted a good deal of attention, and forms the subject of one of Trousseau's clinical lectures, from which I have taken the materials for the following sketch. Synonyms employed are "intermittent tetanus," "contracture of the extremities," "intermittent rheumatismal contractures," "tetania." The malady is not a minor tetanus; though it has some affinities with the grave neurosis it is specifically different from it, and even in its severest forms never seems to develop into it. Its best ascertained *causes* are lactation, diarrhœa, and cold, but mental emotions, constipation, and pregnancy have also some claim to be included in the list.

Trousseau describes 3 distinct forms of tetanilla, but admits that the division is an arbitrary one. In the *mild* form the attack commences with formication in the hands and feet, and some impairment of the free movement of the fingers and toes, which gradually increases as the contracture comes on. When this is complete the hand assumes a conical form, its outer and inner margins being approximated, the fingers pressed together, and the thumb forcibly adducted. Sometimes the action of the flexors predominates, and the fingers are so strongly contracted that the nails leave their mark on the skin; or the lateral compression may be so great that sloughs form on the surfaces in contact. The wrist is flexed, and the hand adducted. The foot is similarly affected, and the heel is drawn upwards by the calf muscles, while the leg is extended on the thigh, and the thigh on the pelvis. The upper extremities and the lower may be affected together or separately, or one limb alone, or even the thumb alone may be convulsed. The contracted muscles resemble tense cords, and forcible attempts to elongate them usually cause much pain; but sometimes such elongation affords relief to the painful cramp of the contracture. These attacks of tonic convulsion last continuously from 5 minutes to 2 or 3 hours, and their cessation like their commencement is attended with formication. The intervals which separate the attacks are longer or shorter, and may be measured by minutes, hours, or days. They are liable to recur as long as the disorder lasts, which may be some days or months. As long as the system is in this peculiar state Trousseau affirms that pressure on any of the principal vessels (arteries or veins) or nerves of a limb suffices to bring on a paroxysm, which, however, ceases as soon as the pressure is removed. It is very noteworthy that the affected muscles are more or less withdrawn from the influence of the will. A patient whose fingers are half flexed cannot close them completely, and the movements in general of the hands (supposing them possible) are more or less clumsy. The faculty of sensation suffers also, the delicacy of touch is lost, and objects handled feel to the patients as if they were muffled up in some thick cloth. The anæsthesia, be it well remarked, is attended with pains extending along the course of the principal nerves, and radiating sometimes to the trunk.

In the *medium* form the intensity of the pain and of the spasmodic phenomena is more marked, and there is some general febrile disorder, with local congestions and swellings, and some derangements of sight and hearing. The contracture is no longer confined to the extremities, but extends to the muscles of the face and trunk, and sometimes to those of organic life. It is, however, specially to be remarked that it does not affect all parts simultaneously, but leaves the extremities before it attacks other parts of the body. Strabismus, dysphagia, dyspnœa, laryngismus, retention of urine are occasional results of the variously localised spasms.

The following is an example of the *grave* form:

Case 1.—A male, æt. 18, was found in the month of December in one of the streets of Paris, where he had passed the night in a state of intoxication. He was as stiff as a bar of iron, had complete trismus, but his intellect was quite clear. When admitted into hospital his attacks occurred at very short intervals. All the muscles, those of the trunk, neck, and limbs, appeared to be seized simultaneously; and as he was quite incapable of voluntary motion he fell on the ground in a state of tetanic rigidity. The contractures were very painful; in a few moments embarrassment of the breathing supervened, caused by spasm of the muscles of the chest, abdomen, and the diaphragm, not excepting those of the larynx. The face became red, the lips livid, the veins swelled, and during this frightful paroxysm of dyspnœa, accompanied with pulmonary engorgement, suffocation threatened. Happily, however, this alarming condition did not last long. Even during these severe attacks the patient seems to have suffered less than a tetanic, and what is very distinctive, when they were over he got up and resumed his occupation of ward nurse. In fact, during the intervals, he appeared to be fairly well, with the exception of some feeling of fatigue and exhaustion, chiefly referred to the joints. The attacks gradually became less frequent, and he left the hospital at the end of a month. Six weeks after the disorder returned, and some time after he died of phthisis.

Trousseau relates one case in a female where death occurred during one of the paroxysms, as much it seems to me from asthenia as from asphyxia. In this, the sole fatal case he has heard of, no appreciable lesion whatever was discovered at the autopsy. He regards the disorder as a rheumatic neurosis.

The *Diagnosis* of the malady from Tetanus is to be made by observing that the disease is intermittent, there is no permanent rigidity; the spasms, instead of beginning with the jaws, begin with the extremities; and the muscles of the limbs and those of other parts are not usually affected at the same time. From epilepsy it is distinguished by there being no loss of consciousness.

In the way of *Treatment* Trousseau prefers bloodletting in patients of vigorous constitution. In those who are exhausted as by diarrhœa he gives opium to arrest the flux and trusts to quinine. He has no doubt of the utility of V.S. or C.C. to the spine, and says positively that the results thus obtained much surpass those afforded by quinine. Chloroform inhalations, and chloroform applied locally (in an ointment) over the contractured muscles are also beneficial. It is remarkable that the application of cold to the affected parts sometimes put a stop to the spasm, although exposure to cold is one of the best ascertained causes of the disease. The relaxation, however, only lasts as long as the cold application is continued.

Much interest seems to me to attach to this malady, not only on its own account, but still more, perhaps, because of its relation to others. To Chorea, Tetanus, Catalepsy, it seems closely allied, and more remotely to rheumatism and neuralgia. By adding another to the list of neuroses to which the human frame is liable, it corroborates the view that the nerve apparatuses have different modes of morbid action, and that their tissue may undergo modifications imperceptible indeed to us, but all varying each in some different way from the normal state. I cannot think that any single condition such as embolism can explain such varying phenomena. This does not appear to me a mere matter of speculation, but one of practical importance, inasmuch as it prepares us to meet with derangements of nerve force, not only in the usual typical forms, but in various more or less strange "manières d'etre," to borrow Trousseau's phrase.

The statements made by this great observer confirm very much the view I have taken of spasm in general. The voluntary muscular power in Tetania is impaired, the muscles are set fast in cramps, but are not necessarily fully contracted, nor can they be so. There is also sensory paralysis, formication, numbness, and pain. It seems as if the intense motor disorder of Tetanus were replaced by a more paretic and more general affection.

The following case is the only one I have met with recorded which affords an example of Tetania in England.

Case 2.—Dr. Edmunds states that a married woman, æt. 28, non-hysterical, after nursing her second child for 9 months was suddenly attacked with cramp-like contraction of the fingers, and pain in the arms, soon followed by a similar condition of the legs. By noon the symptoms had increased, there was extreme and rigid flexion of the hands and arms, and the head was so drawn forward that the backs of her wrists were fixed close to her mouth. By the evening all her symptoms were aggravated, and she suffered so much that her screams could be heard across the road. Her neck became turgid, her respiration somewhat constrained, and she was becoming rapidly exhausted. She had passed a considerable quantity of pale urine. There was an expression of great anxiety and pain upon the face, and the lips were sufficiently retracted to show the teeth; but the expression was not exactly the risus sardonicus seen in opisthotonos. She was quite rational, and merely swayed herself about instinctively. There was no appearance of hyperlactation, no evidence of albuminuria or uræmic poisoning, and no clue whatever to any source of eccentric irritation, except the single fact that her bowels had not acted for 3 days. After administering croton oil, calomel, and a turpentine enema, ice was applied continuously to the spine for 7 hours, at the end of which time all her severer symptoms had disappeared. The screaming and moans were at once mitigated by the ice, and in about half an hour ceased entirely. By the third morning the numbness entirely disappeared, and afterward she had no return of cramp or spasms, but a little sub-acute bronchitis and hoarseness hung about her 10 or 12 days longer. ('Med. Times and Gaz.,' March 12th, 1864.)

CHAPTER XIV.

CATALEPSY.

This rare and curious affection doubtless belongs to the family of functional nervous disorders. It occurs chiefly in those who have weakly and excitable nervous systems, feeble health, and ill-governed minds, and who may be said to possess neither a "mens sana" nor a "corpus sanum." In fact, many subjects of these disorders claim more properly the care of the alienist than of the ordinary physician. At least it may be said that after the cessation of the actual attack, judicious moral treatment will almost invariably be of as much if not more consequence than medical. One case is, however, recorded[1] where it seems to have resulted from an intracranial epithelioma. As regards the nature of the disorder it may be said that it is evidently allied to tetanus, but differs in the circumstance that the brain is involved as well as the cord, and that consciousness is more or less in abeyance. In a case very ably recorded by Mr. Jones[2] it is stated that all the muscles of the extremities and of other parts were so rigid that they could not be moved for two or three hours, and in three other cases which he refers to occurring under the observation of others, the same symptom was well marked. "The extreme degree of rigidity," he says, "generally exists about the commencement of the attack and passes off before the termination." Recently an account has been published[3] of an endemic cataleptic disorder prevailing at Billingshausen, near Würzburg. The population consists of peasants who are well off, but who intermarry very much, and are all small and deformed. The affected individuals constitute half of the number, males as well as females. They are called there "the stiff ones" (*starren*). A chill is commonly said to be the exciting cause of the attacks. The patients are suddenly seized by a peculiar sensation in their limbs, upon which all their muscles become tense, their countenances deathly pale, they retain the posture which they first assume, their fingers are bent and quiver slightly, and the eyeballs in the same way, the visual axes converging; their intellects and senses are normal, but their speech consists only of broken sounds. The attack ceases in from one to five minutes, and the body becomes warm. The indications of a tetanoid affection are very evident here both in the arterial and in the voluntary muscles, and the same is true, as regards the latter, of the following case recorded by Mr. Austen.[1] "A male, the subject of large delusions and markedly dilated left pupil, having once apparently recovered was readmitted. He was now depressed and apprehensive. On the sixth day he became heavy and was got to bed with difficulty. Half an hour afterwards he was completely comatose and motionless; the pulse was scarcely perceptible and could not be counted. A salt injection having been given he was placed on a night-stool, and then it was at once discovered that he was cataleptic. His limbs remained exactly as the attendant left them; his figure without support was as erect as a statue. The legs and arms were put in positions the least convenient and the most opposed to gravity: thus the legs were extended straight from the hips, and the arms at right angles to the thorax. In this singular state and posture he remained a quarter of an hour, when suddenly the enema operated, and the utensil was filled with an immense number of hard fæcal lumps. The pulse on the instant rose, the rigid limbs fell, and the statue vanished. In twelve hours he was sensible and understood questions. In thirty-six hours he was walking about as usual. This case illustrates excellently the effect of intestinal irritation in producing quasi-tetanic affection of the voluntary muscles, cerebral torpor, and inhibitory depression of the heart's action. In the Billingshausen cataleptics it is pretty certain that spasm of the branches of the external carotid existed during the attacks, but not of those of the internal. In other instances, according to Dr. Copland, there is evidence of active congestion of blood in the head. In a case recorded by Dr. Bellingham ('Dublin Med. Press,' July 8, 1846), a female, æt. 18, amenorrhœal, had for more than six months daily fits, in which the cheeks were flushed, the limbs almost tetanically rigid, the pupils mobile, the heart's action violent, pulse 120, respiration tranquil. There was complete unconsciousness and loss of voluntary motion, no recollection of what occurred during the fit. After the first ten minutes of the attack the tetanic rigidity diminished, and the limbs could then be placed and retained in any position. She was cured by leeches to the nares, purgatives, spt. ammon. fœtid., and shower-baths.

---

[1] Canst. 'Jahresb.,' 1861, vol. iii, p. 77.

[2] 'Brit. Med. Journ.,' June 6, 1863.

[3] Schmidt's 'Jahrb.,' vol. cxx, p. 301.

---

[1] Austen on "General Paralysis," p. 55.

In the three cases to which Mr. Jones refers, consciousness was but partially abolished, and the same is true of his own case. In two of these cases the temperature was not materially altered, in one the surface everywhere was of icy coldness, the countenance pallid, and the muscles were rigid as iron, while the pulse was of fair strength. The patient was a stout male, well made, but of nervous and excitable temperament. He had two attacks exactly of the same kind at an interval of about eleven months, both of which were brought on by the same condition, viz. excitement, fatigue, and want of food. They subsided after lasting about twenty-four hours by means of rest, warmth to the feet and the epigastrium, and an opiate (in one).[1] On two subsequent occasions after a day of unusual fatigue he became very restless and troublesome, very stubborn, and partially insensible, but had no cataleptic symptoms. He was soon restored by rest and an opiate. I have cited some of the details of this case because they seem to illustrate very well how causes of exhaustion may give rise to excitement and violent muscular action instead of, as they ordinarily do, producing languor and prostration. In this young man on four several occasions the same cause was followed by the same or similar effects, the chief difference being that the brain alone appeared to be affected in the last two. In the chapter on tetanus I have remarked on some facts analogous to the above, and will only add here that they are all probably ultimately referable to the general law that debility of nerve-tissue often coincides with increased excitability.

Catalepsy evidently is a disorder intermediate between epilepsy and tetanus, with both of which it has affinities. It resembles very much the variety of epilepsy termed tetanic. The peculiar qualities of nervous tissue in different individuals which determine the special form and manifestation which dynamic disorder shall assume are far beyond our observation. One thing, however, we can see, viz. that much depends on which group of nervous centres most readily takes on morbid action. If it be the spinal we have tetanus, if the medulla oblongata and adjacent superior region we have epilepsy, if the mesocephale alone we have so-called hysteria, if the hemispheres alone we have "le petit mal" of epilepsy, or "congestion apoplectiforme cérébrale." Two or perhaps more of these centres may be affected simultaneously, and the resulting disorder will be complex, which appears to be the case in catalepsy.

---

[1] "Case of Catalepsy," by J. Buchanan, Esq., 'Glasgow Med. Journ.,' 1857, 1858.

Treatment must have for its object the removal of existing exciting causes (as in Mr. Austen's case), and the calming of nerve irritation. The latter will in some instances be best effected by sedatives, in others by diffusible stimulants. In conditions of great rigidity and coldness of surface a warm bath, or still better wet packing, would be, I think, very beneficial. In prolonged cases galvanism should be employed, and I should prefer using the continuous current first. In Mr. J—'s case the interrupted current materially diminished the rigidity of the muscles, but the cold douche was rather injurious.

M. Lasègue has recently published some interesting observations on partial and transitory catalepsy (v. 'Archiv. Génér. de Méd.,' 1865, Vol. VI) which go to show that in minor degrees this peculiar derangement is not very uncommon. It is more especially among hysterical females of a dull temperament that the characteristic phenomena are capable of being evoked. They are described as calm, somnolent, demi-torpid, more ready to weep than be excited.

When an hysteric of this description has her eyes closed, no matter in what way, she experiences a peculiar sort of benumbing sensation, which gradually passes into such a profound sopor that she becomes insensible to external sounds, and the life of relation is completely suspended. This state of complete torpor cannot always be produced; in some there is only more or less somnolence. The lethargy varies in duration; it disappears spontaneously after a time, or may be put an end to by sprinkling cold water on the face, or by a smart shake. While it lasts the limbs have a kind of waxen rigidity (Cat. cerea); they may be placed in the most uneasy positions without any muscular quivering or yielding to the influence of gravity. It is a strange spectacle to see a patient plunged in a profound torpor, insensible to all excitation, preserving in the attitudes in which she is placed the immobility and stiffness of a statue, and the most unchanging and absolute indifference however strange or inconvenient they may be. In such states it must be admitted that there is a permanent tension or contraction of the muscles independent of the will, and unattended by fatigue, which even were it unfelt would show itself by relaxation. The muscular rigidity varies in degree, and more or less effort is required to move an articulation, but in the same individual the resistance is almost always proportionate to the volume of the muscles which move the joint. The hip-joint, for instance, has more rigidity than the wrist, and the elbow than the phalangeal. The cataleptic rigidity is general or partial, complete or incomplete, temporary or durable. It may be stated that it is proportional to the profoundness of the lethargy. When this only amounts to a moderate torpor there is generally much more rigidity in the upper limbs than in the lower. In rare instances one half of the body alone is affected. The cataleptic condition of the limbs often coincides with loss of the sense of muscular motion and with cutaneous anæsthesia, but may exist when these are absent. In all instances it ceases abruptly as soon as the patient awakes and recovers her sight. The muscles then lose their rigidity, and the limbs fall into the positions they assume naturally when muscular contraction ceases. During this hystero-cataleptic stupor there is no consciousness of what takes place, but on awaking the patients are aware that they have slept. A small number of those who can be rendered comatose manifest no rigidity, but before they become anæsthetic struggle much in the same way as persons who are subjected to the inhalation of chloroform.

M. Lasègue was for some time inclined to the view that catalepsy was an affection peculiar to the hysteric. He has, however, met with instances which prove that this is not invariably the case. One of these patients was a man, æt. 50, who died of gradual marasmus, and in whose body a careful autopsy demonstrated nothing abnormal, except some lesions of the alimentary canal, connected with the prolonged emaciation. The brain appeared normal. His usual condition was a kind of passive indifference, though twice for a short space of time he manifested insomnia, delirium, agitation, incoherent loquacity. A month before his death closing his eyes by manual pressure induced sufficiently well-marked muscular catalepsy, but no lethargy. Another case was that of a man, æt. 40, who died of pulmonary phthisis, and who, from having been ardent and intelligent in his vocation, lapsed into a state of melancholic stupor. In this man occlusion of the eyes determined an excess of somnolence, without any actual sopor, but the muscular catalepsy produced was extreme. He could be placed in such a posture that only his pelvis rested on the bed, somewhat in the shape of a letter V with its apex downwards, and he could remain thus more than 10 minutes. Yet it took him a quarter of an hour to go down two flights of stairs. A third instance was that of a workman of good constitution, medium height and robust make, who had never had any illness. He then had for a month vague sensations of malaise, something like faints. Eight days before his admission these attacks recurred more frequently, 2 or 3 times a day. On July 2 he was taken, towards midday on returning home from work, with giddiness and loss of consciousness, fell on the ground, and remained unconscious more than 20 minutes. The same day, two hours later, sharp pain came on in the thoracic parietes, below the left nipple, limited to a small space, and increased by movement. Three days later there was no sign of any pleural, pulmonary, or cardiac affection. The patient was uneasy, wandering, answered questions volubly, or with indifference, and did not seem fully conscious of all that was going on around him. Repeated examination demonstrated a very notable hyperæsthesia of all the left side from head to foot, including the left half of the tongue. The muscular power of the same side was also sensibly impaired, that of the leg more than that of the arm. On the right side the motor faculty was perfect, but there was complete anæsthesia even of the same half of the tongue. M. Lasègue says, "the contrast between these two inverse and extreme states was so striking and singular that it could only be accepted as a fact after repeated verifications. In spite of the anæsthesia the power of directing the movement was not lost. When his eyes were occluded sopor came on almost immediately, his eyes were moved convulsively, his respiration became rather stertorous, and the anæsthetic limbs became completely cataleptic, preserving without change any posture in which they were placed. The only treatment to which he was subjected was a moderate bleeding, in two days the catalepsy was much less apparent, and in 3 weeks he was discharged well.

These researches make it probable that Catalepsy in minor degrees, or in partial and incomplete manifestations, may be met with not very unfrequently, and strongly confirm the current opinion that it is for the most part a functional disorder. The cataleptic state, though peculiar, is not so because of any special outside circumstances which give rise to it, but may be produced by the ordinary influences to which we are subjected. The more we advance in our study of the nerve disorders, the greater variety of deviations from recognised types do we meet. To name and classify all these is impossible. What is of practical moment is to note the vital condition of the general system, to determine the quality of the morbid action, its probable causation, and to foresee what dangers it induces. This knowledge gained, we shall not be in much doubt as to the selection of remedies.

LEEDS SCHOOL OF MEDICINE

CHAPTER XV.

EPILEPSY.

Let us first consider the *range* of the term, let us see what disorders are properly ranked under this head. It is no easy matter to do this exactly and correctly, we may err in two ways; on the one hand by too closely restricting our conception of the disease to its more classical types, and so leaving out of count and consideration a great number of more or less closely allied derangements; and on the other by too great laxity in the use of the term, leading us to overlook important distinguishing circumstances. We shall best meet this difficulty, I think, by referring to the principle so well laid down by Whewell ('Philos. of Ind. Sc.,' Vol. I, p. 494). This is that Natural groups are determined not by Definition, but by Type; not by a boundary line without, but by a central point within; not by what they strictly exclude, but by what they eminently include; by an example, not by a precept. "A type," he proceeds, "is an example of any class, for instance a species of a genus, which is considered as eminently possessing the characters of the class. All the species which have a greater affinity with this type-species than with any others form the genus, and are ranged about it, deviating from it in various directions and different degrees. Thus a genus may consist of several species which approach very near the type, and of which the claim to a place with it is obvious; while there may be other species which straggle further from this central knot, and which yet are clearly more connected with it than with any other. And even if there should be some species of which the place is dubious, and which appear to be equally bound to two generic types, it is easily seen that this would not destroy the reality of the generic groups, any more than the scattered trees of the intervening plain prevent our speaking intelligibly of the distinct forests of two separate hills." To apply this to the case before us.

It appears to me that, taking the convulsive form in its entirety for *the type*, it shades off on one side by the petit mal into mere vertigo, on another into hysteria and choreic convulsion, on a third into delirium, catalepsy, and somnambulism, on a fourth into neuralgia. Convulsion and unconsciousness recurring more or less frequently are the grand features of epilepsy; but the former symptom we know may be often absent, and though the latter in a greater or less degree is much more constant it is occasionally much attenuated or awanting. I make this statement on the authority of Trousseau and Sieveking, which my own experience tends to confirm. When the intervals are very long, several years for instance, the character of recurrence loses most of its value. This character is further weakened by the circumstance that the intervals are by no means always free from various morbid phenomena, similar in kind, but less in degree than those which constitute the paroxysm. Thus the convulsive fits may come to be few and far between, but attacks of giddiness may be pretty frequent, and of somewhat long duration, and these mark the persistence of the disorder almost as much as the fits. Viewing this malady from its *phenomenal* side I can only express my entire concurrence with what my friend, Dr. Sieveking, has said—"That several of the diseases that are commonly regarded as residing mainly in the nervous system merge into one another, and that the boundaries by which they would appear to be circumscribed by nosologists are by no means so uniformly to be traced."

If next we take our view from the *causal side* we must, I think, come to the conclusion that epilepsy stands just on the same footing as other diseases. Many different causes give rise to Urticaria, to Asthma, to Bronchitis, to Erysipelas, to Ang. Pectoris, perhaps to many other diseases, yet we usually regard the pathological result as identical. In this we are partly right, partly wrong. Where a cause by its continued operation maintains the existence of the disease, and where to remove it is to cure the disease, that causal condition seems to me to differentiate the disorder from other seemingly identical instances which are not so produced. When, for instance, a chorea is cured by purgation, I do not think the malady can be justly ranked with an apparently similar chorea which is cured by tonics. Nor can an Epilepsy which is caused by a tænia, or uræmia, or lead, or syphilis, be ranked as identical with that which depends on none of these causes, but on some undiscovered state of the nervous system. Yet adhering to our common mode of speech all these and other varieties of Epilepsy, though causally distinguished, are the same affection. In all a similar state of certain nerve-centres is produced, and the resultant phenomena do not differ more in cases of different causation than they do in cases of similar. I think, therefore, that there is no sufficient ground for refusing to include a variety of Epileptiform seizures under the generic head of Epilepsy, though, as in other diseases, the diagnosis of the cause is often of the utmost importance, and should always be carefully sought out. We need to diagnose a syphilitic bronchitis for the purpose of treatment just as we need to diagnose a syphilitic epilepsy. It is of prime importance to diagnose cysticercal epilepsy from the so-called essential, but Griesinger affirms that the one is in all respects like the other; and Trousseau affirms the same of puerperal eclampsia, children's convulsions, and those resulting from lead poisoning, or uræmia. ('Clinique Méd.,' Vol. II, p. 89.) Nothing in the form of the phenomena distinguishes them from epilepsy, but the rapid recurrence of the seizures, and especially the circumstances under which they occur commonly afford data which enable us to do this. Thus epileptic attacks in a teething child, a parturient woman, a patient who is the subject of uræmia or has a tænia in his intestines, are most probably dependent on the special morbid conditions existing, and may entirely pass away with them. Still even in these instances it is clear that there must be some pre-existing state of the same nature as that which exists in true epilepsy, since the occurrence of such attacks is much less the rule than the exception. So much is this the case that Trousseau, after drawing the distinction between eclampsia and epilepsy, adds—"il est des réserves a faire. These eclamptic convulsions, whatever may have been their exciting cause, are often in fact real attacks of epilepsy. Especially when these convulsive symptoms occur in children more than 5 or 6 years old, and even in younger children when they return frequently on the least occasion there is reason to apprehend that they will become epileptic."

If I could think it worth while to make statistics of Epilepsy I should, of course, be very particular to class together none but cases similar in every respect, and I should then agree with Dr. R. Reynolds as to the propriety of restricting very much the appellation. But having the smallest amount of faith in the value of such countings, on account of the extreme difficulty of bringing together cases that are really alike, I feel quite satisfied to use the generic term Epilepsy somewhat loosely, and to qualify it as our predecessors have done by joining to it epithets which point out the most important peculiarity in each particular case, or group of cases. The terms "enteric," "uterine," "gastric," "hepatic," "genital," &c., seem to me to fulfil a useful purpose by indicating the special starting-point of disorder in cases of peripheral origin, others as "plethoric," "asthenic," "arthritic," by denoting the states of the system, while some such term as "essential" is needed to designate those cases where no cause can be discovered for the morbid action.

Epilepsy presents itself to the watchful observer in various *guises*. Not only in the convulsive form so alarming and distressful of the 'grand mal,' or in the less menacing, but scarcely less serious, form of the vertigo, but also in other less familiar modes. Trousseau affirms that nothing is more irregular than epilepsy in regard to its features, as well as to its course, and the frequency of its occurrence. He gives the name of "*partial* epilepsy" to a condition marked by paroxysms, more or less frequent, of pain or convulsion very similar to those constituting the *aura* of the complete attack, but unattended with any loss of consciousness. One case he relates is as follows:—A young man, æt. 18, had suffered his first attack of epilepsy when only 12 years old. He had for some time violent convulsive fits. Subsequently these became milder; and though convulsions occasionally took place, the disorder mostly affected the form of vertigo. At the time he was under observation the malady had still further declined, the only phenomena were convulsions of the face, exclusively limited to the left side, without any disorder of the intellectual faculties. When these occurred the patient first experienced at the top of the chest a distressing painful sensation, which all at once extended from the trunk to the face, the muscles of which were thrown into quivering contractions. At the same time his speech was embarrassed in consequence of the involuntary action of the muscles of the tongue and cheeks. In this instance the history left no doubt that the malady was really epilepsy, though shorn of its usual phenomena. The following case, which a good deal resembles the preceding, is at present under my care.

Case I.—A. G—, æt. 48, a clerk, when young was much addicted to debauchery, and half ruined himself. Sixteen or seventeen years ago he had an attack of right hemiplegia, was laid up nearly 4 years. During this period epileptic attacks occurred very frequently, for the first 2 or 3 years he had 3 to 4 a day, afterward they gradually lessened. They were absent for 5 or 6 years, then one occurred 15 months ago, and the last about 6 weeks ago. In this he was conscious, knew what was going on, but was unable to speak. In the attacks he has bit his tongue. The paralysis has nearly disappeared. His urine is very albuminous, but of good colour and sp. gr.; if he has any anasarca it is slight. During about 20 months that he has been under my care he has had no complete epileptic attack, but on two occasions has had premonitory symptoms. These consist in flexion and rigidity of the right hand and arm, with numbness and crampy sensation; if they continue he becomes after a time insensible. By rubbing the bare limb this consummation of the paroxysm is prevented. Thus much for his general state. The particular phenomena, however, for the sake of which I have cited the case, are the following. Almost every day he gets an attack of muscular tremor, which may come on while he is walking in the street or while he is in bed. It begins in the lower part of his right leg, extends up higher and higher to the thigh, the abdomen, and at last to the head, which vibrates from side to side. If he can disperse flatulence, he is immediately relieved, the tremor either does not reach the head, or if it has it is arrested. When the tremor attacks him while walking, he is obliged to stand still; and by grasping the limb he prevents it going higher. When it attacks him in bed it often reaches his head.

The connection of this affection with epilepsy, and its resemblance to a motor aura, is very apparent. It is a modified or fragmentary epilepsy.

I have at present a man in St. Mary's, J. M—, æt. 44, who has had epileptic fits for 4 years, since he was injured at the back of his head and neck. The attacks have been of the convulsive character, and he has bitten his tongue. At present they are less severe; he does not become unconscious completely, but cannot see clearly, nor speak, nor stand. The attacks begin at times in the left foot, at others in the left hand. When they begin in the hand the fingers close in flexion, but the thumb is not turned in, the forearm is agitated to and fro on the arm, and afterwards the arm on the scapula; the agitation then proceeds up the side of the neck till it reaches the left angle of the mouth, where it stops. The progress occupies 2 to 4 minutes. When it starts from the foot it works up along the limb which is agitated, along the left side of the body, and the left side of the neck, the left arm at the same time being affected with jerking movement, until it reaches the left eye. The muscles of the left side of the face are affected, as the angle of the mouth gets inverted, drawn in towards the buccal cavity. No unconsciousness occurs; there may be some giddiness "before the left eye," but nothing more. The process, when the fit commences in the foot, takes about 5 minutes. Sometimes the attacks commence in the left hand, corner of left eye, or left corner of mouth, and are limited to the vicinity. Rubbing the hand or mouth will stop an attack.

To the same head of partial epilepsy we may refer certain instances of disorder, to which Dr. Sieveking applies the term "*cephalalgia epileptiformis,*" occurring, possibly, in a subject in whom the epileptic paroxysm has been manifested merely by slight vertiginous attacks, by a single attack in former times, or by some spasmodic action that alone would not be regarded as of an epileptiform character. The following is an illustrative case. E. G—, æt. 37, widow, robust and florid, has always enjoyed good health, except that she has been subject to headache. A year before consultation E. G. felt a sudden numbness in her right leg, ascending to the trunk, right arm, and face, with a film over her eyes, and leaving a violent headache lasting the whole day. The numbness passed off after 2 hours. These attacks returned about once a month; they took away her senses, but not to such an extent as to prevent her being conscious of what was passing around; articulation became impaired, and the patient complained of being very nervous. (P. 57.)

Another mode of epileptic manifestation is that of *vertigo.* I do not mean such as occurs in the short seizures of rather unconsciousness than giddiness, which constitute the petit mal, but much more prolonged, lasting for several days or hours, and often replacing or alternating with complete attacks. Such giddiness is sometimes the sole or chief morbid result of injuries to the head, which, in other instances apparently similar, induce epilepsy. It is very worthy of remark how in some of these cases a brief paroxysmal exhibition of disorder appears to be the equivalent of a much more continuous affection. The same is also very evident when tænia gives rise to cerebral symptoms. Occasionally paroxysmal epilepsy is the result, more often a permanent distressing giddiness. The following history illustrates such vertigo as I have referred to, and also the cause which gave rise to it.

Case 2.—W. C. A—, male, æt. 36, hammerman, seen November 10th, 1864. Has been ill 12 months. Is engaged in beating hot iron near a furnace; a well made man, with intelligent countenance. Has never had any previous illness. He feels languid and weak, and says the work is beating him all to pieces. Has lost a stone in weight during the last 6 months. Pupils large. Forehead not hot. Skin cold. Pulse quiet. Tongue clean. Urine not albuminous. No cough or expectoration. No night sweats. Sleeps well some nights, at others is restless. Has a very little pain in head towards right side, no tenderness. He used to have indigestion and bring up much fluid, but this disorder is better now. Denies syphilis. Has never passed worms, and is not fond of underdone meat. His chief complaint is of giddiness of head, which is made worse by stooping or turning suddenly, and is relieved by repose. This disorder is getting worse. At times the giddiness is much aggravated, and he loses his memory; these attacks last about 2 hours, and his memory remains impaired for 2 or 3 days after. In some of the attacks he gets quite unconscious, falls down, and remains insensible for about 1 hour; does not struggle. Some days he is much more free from the giddiness. His friends notice that his mental faculties are getting impaired. He says he is getting deaf. There could be little doubt that exhaustion of nerve power was the principal cause of his malady, so I tried to restore and sustain it by prescribing for him Strychnia gr. $\frac{1}{16}$ in solution *bis* vel *ter die,* and Ol. Morrh. ʒi *ter die.* With these remedies and a certain amount of rest he benefited materially, got much better by December 8th, after which I saw him no more. The giddiness in this case seems to have resulted from a minor degree of the derangement which at times produced the epilepsy, but it could not be ranked as "petit mal."

Another variety of epilepsy is that where the aura, mostly a visceral one, assumes unusual prominence, and is apt to be misinterpreted. Trousseau relates the following illustrative case.

Case 3.—"The patient was a boy about 10 years old, who 4 or 5 times a day, before as well as after a meal, and always without appreciable cause, complained suddenly of a sensation of pressure in the pit of stomach soon followed by vomiting. Immediately upon this he felt violently giddy and turned deadly pale. These phenomena lasted altogether for about a minute. The medical man who sent the patient to me, believing him to be suffering from dyspepsia, had vainly tried every means for combating it. The suddenness of the attack, the violence of the pain, which the child described perfectly, the accompanying sense of suffocation, the momentary impairment of the intellect, the pallor of the integuments, and lastly the rapidity with which these phenomena disappeared, made me write to the usual medical attendant that the case was certainly one of epilepsy, adding that sooner or later the malady would become more fully developed. The boy's father refused to believe in my diagnosis, and his medical man concurred with him. Before a year had elapsed, however, all doubt was removed by the occurrence of repeated attacks of epilepsy."

The mistake which was made in this instance is a very possible one. In similar cases where the vertigo was less marked there would be much temptation to regard the disorder as a mere gastralgia. The name of epilepsy sounds so formidable that we naturally are as reluctant to announce as our patients are to credit its existence. Indeed, I am not sure whether such epilepsy as this initiated by a severe pain, is to be regarded quite in the same light as epilepsy where the attacks are not associated with any notable peripheral symptom. The disorder in the above case *was* a gastralgia, though it was much more. The pain was at first seated in a quaternary centre (solar plexus), but soon diffused itself upwards and involved the higher centres. Had the primary affection been arrested the encephalic disorder would have lost its starting point.

Another mode in which Epilepsy, or perhaps I should say the epileptic tendency, manifests itself is that which Dr. Ramskill has distinguished by the term ganglionic. He applies this epithet to a class of cases in which an aura occurs consisting of some disturbance of sensation accompanied or not by abnormal feeling of motion in the abdomen. Patients describe those feelings variously, as turning upside down, sinking, fainting, a sense of great coldness, or a rush upwards from the epigastric region, of heat, trembling, borborygmi, shivering, or a feeling of complete collapse, and emptiness of stomach, sometimes with nausea. More or less of these feelings may be always present, and exaggerated only just before a fit. Ramskill believes the symptoms complained of arise from a disturbed condition of the solar plexus and the ganglionic system of the abdomen generally. It may be from a failure of action or from a disturbed or intermittent action of the solar plexus and its dependent neighbouring ganglia. The morbid action starting in the ganglionic system propagates itself by way of the splanchnic nerves to the cerebro-spinal centre, and a fit follows. He enforces more particularly that this disorder of the ganglionic system is a disease *per se* often existing alone and antecedent to any epileptic attack; in fact, that the epilepsy is an accident which issues from and follows it, and so is fundamentally different from epilepsy arising from disease in the cerebro-spinal centre, or from a distinct cause of irritation situate in any other part of the body. This ganglionic affection is as much related to hysteria, tetanus, catalepsy, and perhaps intermittent fever and cholera, as to epilepsy.

Between such cases as Dr. Ramskill alludes to and those in which a visceral aura is a prominent feature there is evidently much affinity, and the difference seems to consist chiefly in this, viz. that in the latter, where actual epilepsy occurs sooner or later, the disorder of the inferior centres has a greater tendency to spread to and involve the higher. The following history from my own records affords a fair instance of the variety above described:

Case 4.—J. C—, æt. 13, a fair, delicate looking boy, with clear complexion, pale anæmic face. All his relations stated to be healthy. Never had rheumatism. He was admitted Feb. 28th, 1868; stated that his first fit occurred about 3 weeks ago while he was cutting wood; it lasted about 45 minutes. Since then the fits have recurred every day up to the present time; on an average he has two a day, each lasting about half an hour. They come on with a sense of sinking at the stomach, then he turns giddy and falls down, but does not lose consciousness. Has sinking sensations in stomach and faintness while walking about. The heart's sounds were loud and clear; pulse 88, weak; slight headache; functions generally in good order. A fit occurred on 29th, in which the right arm and both legs "twitched and worked," but he was quite conscious. Two other attacks occurred during his stay in the hospital, in both of which he retained consciousness. The sister of the ward thought his fits rather hysterical. His urine was normal; no worms were passed, though he had several doses of santonine. Iron and Ol. Morrhuæ were given with much benefit. He then went into the country for a month, where he was very well. After he came back to London he had some diarrhœa, and probably was worse fed than he had been. On May 15th he got a fright, which was speedily followed by chorea. A week later he was readmitted suffering with this neurosis very markedly, but quite free from his former attacks. Calabar bean was given and he left June 27th much improved. There can be no question that this lad's disorder was not in any degree feigned. The convulsive attacks were evidently of epileptic character, and yet differed much from those of true epilepsy, especially in the retention of consciousness. The transmutation of the malady into chorea is a point of much interest, marking the affinity which subsists between the several neuroses. It seems to me very instructive to note cases of this kind which manifestly form transitions between the typical forms of classic disease. They show us (what we are slow to believe) that 'the insatiable variety of Nature' is as great in the pathological as it is in the physiological state. In some cases of this kind Dr. Ramskill has found oxalate of cerium serviceable.

Another variety is that in which the seizures which are really of the nature of epileptic vertigo have more or less resemblance to attacks of syncope. This point has been noticed by Dr. Reynolds who remarks, that there is perhaps a much closer analogy between them than is sometimes supposed. There is some risk if we are not on our guard of our being misled by the patient or his friends denominating the attacks as faints, especially if we have not the opportunity of witnessing them for ourselves. The chief points of distinction are the greater brevity of the attacks of petit mal, their more sudden invasion, more frequent recurrence, the absence of any sign of weak or failing action of the heart after exertion, and the supervention of the so-called "faints" without the person having been exposed to any of the causes of syncope, such as fatigue, hot rooms, &c.

To illustrate the point before us I will narrate shortly two cases.

Case 5.—The first is that of J. S—, æt, 40, a butler, who was admitted July 13th. He stated that he was generally healthy, had never had fits before, but often had had faintings, especially in the morning during the last 6 years. Rheumatic fever 12 years ago. No sign of syphilis. Functions in tolerable order. Head cool. Pain across forehead the last few days preventing sleep. Was taken ill on 11th, fell down in a faint, was quite conscious about 10 minutes. Knows no cause for his faint. Has been giddy at times ever since; turning round makes him giddy immediately. Another fit occurred yesterday, from which he has not yet recovered; is very lost at times. He stated that the attacks were preceded by a sense of trembling or fluttering at the epigastrium and left hypochondrium, and cold perspirations. Urine natural, not albuminous. Heart's sounds normal, action regular. No arcus senilis. Exertion did not cause any fainting. After a few days the headache became more diffused, and giddiness was felt both in the recumbent and erect posture. Ammonia and Indian hemp were given with benefit, and subsequently Iron and Quinine with Sulphuric Ether. Giddiness recurred occasionally during the time he was under observation (about 6 weeks); sometimes it came on suddenly and lasted a few minutes, at other times was more continuous. The appetite at first was bad, but afterwards became very good. The giddiness in this case is a tolerably sure exponent of the real nature of the so-called "faints," the frequent recurrence of which, during so many years, in the absence of any evidence of cardiac disease, or notable exhaustion, makes it pretty certain that they were not at all of syncopal character.

The second case is that of—

Case 6.—J. W—, æt. 48, was admitted with moderate bronchitis. Arcus senilis marked. He gave no history of fits. Complained of occasional pain in the left side and shoulders, but mostly in the precordia; this was not specially brought on by exertion. When the precordial pain came on he felt giddy and inclined to faint. While under observation he had 2 attacks, the phenomena witnessed were dyspnœa and faintness, convulsive working of the brows, and convulsive tremors of the arms, impairment or loss of speech.

There can be no doubt, I think, that this was *au fond* a case of Epilepsy, but the precordial pain and the faintness also indicate an unmistakeable affinity with Angina Pectoris. Trousseau expresses confidently the opinion that in not a few instances Angina Pectoris is an expression (a manifestation) of epilepsy, a modification (manière d' être) of its vertiginous form. In some cases angina precedes and epilepsy follows, in others the order is reversed. (Tr., vol. ii, p. 444.)

Before quitting this part of my subject I must allude to a modification of the convulsive paroxysm, which is very perilous but fortunately very rare. It sometimes occurs that the tonic contraction of the muscles, which at the commencement of the paroxysm hold the thoracic and abdominal walls in a state of tetanic rigidity, persist for an unusually long time. Instead of lasting only from 15 to 30 seconds, this tonic contraction may extend over 2 or 3 minutes, and the patients die of asphyxia in the same way as sometimes occurs in tetanus, or in strychnia poisoning. Trousseau, on whose authority I state this, relates the case of a child who died in this way. As the apnœa in such instances is of the simple kind, the air-passages not being obstructed, there seems to be some hope that artificial respiration, employed in Dr. Silvester's method, and aided perhaps by the warm bath, might restore life, even when it appeared to have fled.

Ætiology.—The causes of Epilepsy, using the term in its widest sense, are very manifold, but are all such as in one way or other impair nerve-force. Toxic matters as in uræmia, lead poisoning, and malarious cachexia; remote irritation, as a tænia in the bowels, a syphilitic endostosis, or a carious tooth; direct irritation as tubercles or cysticerci in the grey substance of the convolutions; immaterial agencies, as fright, the imitative tendency, prolonged anxiety; excitement and subsequent exhaustion of nervous centres, as by excess in venery or alcohol; and lastly, cerebral hyperæmia, may all, I think, be justly regarded as efficient motors of epilepsy. Besides these, we must leave a tolerably wide margin for unknown causes, which we must assume to exist in those too frequent cases where our closest scrutiny fails to detect any perturbing influence past or present. Hereditary taint, or inherited weakness of the nervous system is probably the most common of these. It is that on which Trousseau is most inclined to lay stress. Dr. Begley's experience at Hanwell is also corroborative. He finds that a large number of confirmed epileptics have suffered from fits during childhood, the defect in the nervous system showing itself thus early under the irritation of teething. I do not myself see why we should expect to find a definite cause in every case, why we should not be content to recognise an originally imperfect, infirm condition of nerve tissue, more or less prone to disorder, as a sufficient basis of morbid action. We have no right to assume that all individuals are born with a typically sound nervous system, when we see how many have congenital blemishes, as nævi, imperfect irides, &c. Even granting that all were at birth perfect, both in respect of structural and functional power, is there anything contrary to sound reason in concluding that the nutritive force and endowments of the nerve tissue are liable and likely to fail or deteriorate in one way or another as time passes on? The tendency to decay is strongly marked on all living things, and we may almost say that in ordinary cases there is as much provision made for enfeebling and impairment as there is for conservation of vitality. To me, therefore, there is nothing surprising that, apart from any definite cause, the nervous apparatus, as well as others, should be prone to functional disorder or organic change from mere failure of its vitality. Such must surely be the case when epilepsy supervenes in advanced life in persons otherwise quite healthy. Dr. Reynolds mentions the case of a man, in every respect in apparent health, who became epileptic about the age of 70. Trousseau alludes to a military man who had his first attack when 80 years old, and died in a paroxysm at 93.

Even in those cases where we do find what we consider a sufficient cause, are we not constantly obliged to admit the existence of some other condition favouring its effect, which we term Predisposing? How commonly do we meet with instances where the same exciting causes exist yet without resulting disease, simply because the organs are inapt to take on the morbid action. Out of 100 persons who are frightened, or commit excess, or suffer from lead poisoning, have a tænia in their bowels, how many have epilepsy? Certainly we may say only a small minority, and if so, it is clear that, without questioning the efficacy of these causes, we must admit the operation of some still more potent, but which unfortunately are beyond the range of direct observation.

Of the more evident causes we may say that some are both predisposing and exciting, thus remote irritation may, by its continued action, generate hyper-excitability, and then start off the deranged apparatus into demonstrative disorder. A predisponent cause is often the really efficient one, and that which calls forth the actual phenomena of the disease is utterly trivial, and often quite unnoticed, so that the paroxysms appear to be spontaneous.

To pass now from these generals to some points of detail. I must affirm my belief in the older view, which Trousseau and Reynolds seem disposed to discredit, that *venereal excess* is a potent cause of epilepsy. I have details of two cases, and was consulted in a third, where this causation could not, I think, be justly questioned. Apart from direct evidence as to its effect in producing epilepsy, there is abundance of proof that this cause acts most injuriously on various nerve-centres, perverting or even destroying their functional power. Paraplegia, mania, dementia, are certainly results of excessive indulgence, natural or unnatural, as well as sundry other less definite disorders. If the lower segments of the cord, and the highest and largest nerve-centres can have their nutrition so deranged by excessive excitement as to be paralysed, or thrown into morbid excitement, is it not reasonable to expect that the medulla oblongata may be similarly affected. *Intemperance* in the use of stimulants is another efficient cause which, however, may be intentionally concealed from us, or to the existence of which, as Mr. Simon warns us, we may be unwitting accessories. He has seen, he says, on various occasions, a convalescent suffering from considerable nervous disorder from merely continuing the large quantity of stimulus which had been necessary to him during earlier periods of his illness. And in one such case the cause of the inconvenience was not suspected till it had occasioned the patient a first attack of epilepsy. The possibility of *latent syphilis* being the cause of epileptic attacks should not be forgotten. Trousseau relates an instructive case of this kind in which the probable existence of an endostosis was only made out by close scrutiny, and afterwards demonstration was obtained that this was the source of irritation by the success of mercurial treatment. That good physician, T. Williams, of Swansea, now no longer with us, records a quite similar incident in his own experience. "Ten years ago," he says, "a gentleman about 40 years old became the subject of secondary symptoms, for which he was carefully treated. During the 9 subsequent years no syphilitic disease of any kind occurred. He reports himself as having enjoyed perfect health. Two years ago, in the tenth year after his attack of syphilis, he became the subject of epileptic fits. These fits with variable frequency had now lasted for nearly 2 years.

They had been treated with belladonna, quinine, &c. All these remedies appeared only to intensify the attacks, and to increase their frequency. Subsequently his previous illness was called to mind, and its suggestions acted on. Iodide of Potassium with Carbonate of Ammonia was given freely. From that date no epileptic fit has occurred. Several months have now elapsed since the last fit, before they were of daily occurrence" (*vide* 'B. M. J.,' 1862, April 12). Lately evidence has been adduced that *malaria* may give rise to epileptic attacks, which is no more than might have been expected considering the special tendency of this agent to generate neurosis. Convulsive or epileptic pernicious agues have been described long since, but Dr. Payne tells us that epileptic attacks may be the only active symptoms which the malarious intoxication, sometimes of old date, evokes. In some cases of this kind no ague has ever occurred. Cases of infantile convulsion are frequent in Calcutta, which stand in very close relation to malarious epilepsy. In all of these quinine affords a cure. The late Dr. Brinton mentioned to me once that he had met with cases of this kind.

From an observation of my own which I have published in a Clinical lecture (v. 'Med. Press and Circular,' 1867, March 30th) I am much inclined to believe that *latent rheumatism* may act as a cause of Epileptic attacks. There was some slight articular affection of the right upper limb, which was also at times affected with convulsive agitation, and there was a rheumatic odour about the patient. In the first attack he was quite unconscious for several minutes. Rheumatic fever was prognosed, it came on in a well-marked form, and as it became developed all the previous disorder ceased. He was discharged well, except some occasional pains. The only flaw in the case is that there was some question whether he had not suffered from attacks of Epilepsy before. He, however, entirely denied it. Sander, a German observer, has met with cases of severe mental disorder, attended with convulsive and choreic movements, which commenced during an attack of acute rheumatism, and persisted a month or more after it had ceased. There seems no reason why the cause of acute rheumatism should not affect the encephalon in the same way as malaria may do. Research directed to the discovery of causal conditions of this kind seems to me very desirable. Dr. Garrod writes that "Epilepsy is not uncommon in gouty subjects, and appears to be closely dependent on the diathesis which gives rise to the articular affection; it sometimes distinctly alternates with joint affection, at others the two may occur simultaneously." Dr. Copland cites Van Swieten to the effect that in cases in which he has seen an Epileptic seizure in the gouty, the occurrence of a regular paroxysm of gout has prevented a return of the Epilepsy. The use or rather abuse *of tobacco* is a possible cause of Epilepsy. Sir R. Martin has informed me of an instance in which fits occurred once a month or oftener, and were becoming more frequent, but after the patient, at his strong recommendation, was prevailed on to give up the habit the attacks entirely ceased. The other injurious effects which it is known to produce on the nervous system render such events the more probable. Dr. Prout mentions having found an *excess of urea* in the urine associated with Epilepsy, and Dr. Sieveking speaks of this as a frequent occurrence. It is difficult to determine whether the azoturia is cause or consequence of the nervous disorder. As the latter is often much relieved by means which diminish the secretion of urea, I am quite inclined to think that Epilepsy, as one form of nervous derangement, may sometimes acknowledge this debilitating drain as its cause. However, I must say that in a man, æt. 34, under my care, who had well-marked "petit mal" and azoturia, the former had existed from the age of 7 or 8 years. This patient passed 48 oz. of urine in 24 hours, sp. gr. 1028, total urea, 872 grains. How long he had done so I cannot say, but it is probable that the urinary affection was the later in time of the two.

The *Catamenial period* has sometimes a marked influence in the causation of Epilepsy, the attacks occurring at this time and at no other. There is no doubt that this period is characterised in most females by an enfeebling of nerve power, which is sometimes very marked indeed. In fact the process itself consists, in no small measure, of such changes in the uterine arteries and capillaries as proceed from impaired innervation. That this time of depression of nerve-force should ensue spontaneously, and that it should afford, so to speak, an opportunity for the invasion of Epilepsy, seem to me very significant facts. They hint to us that changes may take place in the vital condition of the nervous system without any apparent cause, and that such changes may greatly favour the occurrence of actual disease.

The importance of closely scrutinising the past history of the patient to ascertain whether he has received *any injury to the head*, is well shown by a case I take from Dr. Forbes Winslow ('Obscure

Dis.,' p. 674). "A boy received a violent blow on the head from a cricket bat. He did not appear to suffer any inconvenience from the injury until 10 or 11 years afterwards, when he became subject to paroxysmal attacks of headache, associated with extreme vertigo clearly of epileptic character. He eventually had a succession of severe attacks of Epilepsy, which continued for a period of 5 years. He ultimately died in a violent epileptic paroxysm. An encysted abscess of the size of an egg was found in the cerebellum."

The influence of *habit* in maintaining the tendency to Epileptic attacks, on which Dr. Sieveking has justly insisted, is forcibly illustrated by another case also related by Dr. Winslow. "A young gentleman had been subject from an early period of his life to Epilepsy of varying degrees of frequency and severity. Many years back the fits appeared to occur less often, and were somewhat diminished in violence. At this time he discharged from his bowels an enormous tapeworm. The medical gentleman attending the patient at once exclaimed 'here is the cause of the Epilepsy,' and very reasonably inferred that the disease would subside, or be disarmed of its more formidable features. Contrary, however, to expectation, the epileptic fits recurred with increased violence, and continued until the moment of death. Reasoning *à priori* it was concluded that the brain would unquestionably manifest some unequivocal symptoms of organic change either in its substance or investing membranes. But such was not the case. Beyond an unusual firmness or consistence in the nervous tissue of the whole of the brain, not really amounting to induration, there was nothing within the cranium that could satisfactorily account for the great severity and long duration of the cerebral disorder."

It appears to me in this instance that the functional derangement, or slight induration of the encephalon, induced by the long-continued irritation to which the parasite gave rise, persisted even after the original cause had been removed. Similar occurrences are not unfrequent, as when Chorea, or Epilepsy, is produced by a fright.

Venous congestion appears to be occasionally the principal cause of epileptic seizures, as exemplified in the following interesting case, for which I am indebted to Mr. Painter, of Beaufort Gardens. A patient, under his care in 1848, had then suffered with Epileptic fits for 10 years, and still survives, or at least was alive in 1868. The peculiarity of his case was this, that generally before having a fit he became extremely congested about the head and neck. These parts for some hours previous to the fit used to assume a dark livid hue most unpleasant to behold. The swelling was so considerable that the patient of his own accord was in the habit of taking off his collar and neckerchief, and undoing his shirt-band. During this distressing state his mental faculties were more than usually impaired, though not sufficiently to prevent his using his mind in some trivial way, as in playing a round game of cards. Previous to the fit he usually had an aura in the form of a pain in his left ring finger. During the fit the blueness or lividity disappeared, but, *I think* (says Mr. Painter), the face remained puffy for some hours after. The bad effect of stimulants was very marked in this case, as if the poor fellow exceeded 3 glasses of wine at dinner he was pretty sure to have a fit the following night. He did not appear to have any obstruction to the general circulation in the heart and lungs, and had no præcordial anxiety, palpitation, dyspnœa, &c. That the veins of the neck and head became inordinately distended seems clear, but the cause of the distension can only be conjectured. It does not seem improbable that it depended on spasmodic constriction of the circular fibres of the coats of the larger venous trunks.

Abnormal *increase of pressure* seems to have some claim to be regarded as one of the causes of Epilepsy. In Sir Thomas Watson's 25th lecture two cases of hypertrophy of the brain are related. The subject of the first was a female, æt. 19, in whom the cranial bones were uncommonly thick, dense, and heavy, and the convolutions were remarkably flattened, and the arachnoid dry, while the ventricles were small. The brain was apparently healthy. She was epileptic. In the other case the patient was between 2 and 3 years old, and at death the anterior fontanelle was still open (its diameter being 2¼ and 1½ inches). There was some meningitis of small extent, but the brain was healthy, the convolutions retained their proper rounded shape. He never had any fit or convulsion. This child's head was very large, and had gradually increased from the age of 6 months, but as the bony case yielded readily the brain was not subjected to pressure. The same was observed in Scoutetten's case. In the first case these conditions were reversed. Drs. Bucknill and Tuke describe the hypertrophied brain as eminently anæmic, the blood-vessels being compressed, and state that the first symptoms are failure of mental function, and especially of the memory, with subsequently Epileptiform convulsions. Andral states that whenever he has found the brain really hypertrophied it has also been remarkably pale. Dance's cases give (he says) the same result. A slight or intense headache, permanent or transient; convulsions at intervals; and true Epileptic attacks are enumerated by Andral as the symptoms of the earlier period of cerebral hypertrophy. It need hardly be observed that the hypertrophy is unreal, and depends doubtless not on increased formation of nerve-cells and fibres, but of the interstitial substance.

Tickling the soles of the feet can hardly be regarded *per se* as an important motor of epilepsy, though there seems to be no doubt that it may have this result. Van Swieten, Esquirol, and Russell Reynolds relate cases in point. The first of these is as follows:—"A very healthy girl, æt. 10, born of sound parents who never had the Epilepsy (was) rendered epileptic for several years, and the first time she was seized was upon having her soles tickled by some girls who were at play with her, some of them holding her fast upon the floor to prevent her avoiding that intolerable sensation." Such instances certainly show how potent external irritation may occasionally be in producing the disease, and suggest besides that it is not every irritation but a particular kind which has this effect. It seems that the perception of the excitement need not be very keen, as in Reynolds's case the patient was not awoke by it. A case related by Brown-Séquard points to the same conclusion (v. 'Physiol. of Centr. Nerv. Syst.,' p. 185). He states "that it results from the thorough examination of a great many cases of aura, that we must admit that an unfelt irritation starts at the same time as the aura from some centripetal nerve, and is the real cause of the epileptic seizure." This is in a measure true, but we must also recognise the existence of a peculiar state of the nerve-centres which renders them susceptible of being deranged by such irritation. While on this subject it may be worth remarking that irritations every now and then arise apparently quite spontaneously in the extremities of our sentient nerves, which if they continued would be intolerable, and which we are fain to remove by vigorous rubbing. If such states of peripheral nerves were transferred, I do not mean the perception of them conveyed, to our encephalon, the results might be grave.

Lastly, I wish to express strongly my conviction that Epilepsy may occur under causal conditions which are well nigh diametrically opposite. I will state two typical instances from my own experience.

A man, æt. 32, is a confirmed epileptic, is in consequence out of work and lives badly. He is feeble, with a cool skin, a small weak pulse, and a dulled intellect. The better he lives the freer he is from his attacks. From the age of 15 to 20 he indulged so much in venery that he became at last impotent for a time, and laid in this exhaustion the foundation of his malady. Here is Epilepsy from asthenia. On the other hand, I have published ('B. M. J.,' 1868, Vol. I, p. 113) the case of a man, æt. 49, who 11 years ago had for the first time and without evident cause several epileptic fits, which were only arrested by V. S. Since then he has had at longer or shorter intervals severe attacks of vertigo which have proved almost invariably refractory to all remedies (though many have been tried), except the removal of 15 ounces of blood from his arm; after this depletion he rapidly improves, and is able to go to work again in a day or two. Here is Epilepsy, and its vertiginous equivalent from Hyperæmia. Cases of this kind are certainly rare, but by no means unparalleled. Our predecessors seem to have met with such not uncommonly. Dr. Prichard relates a case of uterine epilepsy, as he terms it, the subject of which, a girl, æt. 18, who was amenorrhœal, was bled from the arm 4 times to 16 ounces in the course of about 3 months, besides being purged, with the result of arresting the fits and re-establishing the missing function. Another similar case was bled 7 times, and though she remained amenorrhœal the fits did not recur, and her health was good. C. H. Parry records the case of a nobleman, who had been a gross feeder, and had epileptic fits. He found him after having suffered repeated paroxysms of the disorder insensible and stertorous, his face extremely flushed, and his pulse strong, full, and labouring. After repeated venesections with purgatives, low diet, and exercise, the patient recovered completely and had never any return of his malady.

Let me also refer to a case quoted by Schr. v. d. Kolk, in which compression of the carotid succeeded 22 times in cutting the fit short, the patient experiencing great relief and improvement.

Are these latter cases to be ranked in the same category as the one first cited? Can we consider their efficient causes at all similar? I trow not. The conclusion appears to me unavoidable from this and much other evidence that might be cited, that Epilepsy occurs under very different conditions of system, and I need not dwell on the important bearing of this view on treatment. So current, however, are the opposite opinions put forth by some of our most meritorious workers at the present time, that I am glad to fortify my position by the following passage from the work of my colleague and friend, Dr. Sieveking. He says, p. 183—"But although the disturbed polarity which induces the paroxysm most frequently depends upon exhaustive conditions, so much so that some writers, among whom I would especially mention Dr. Radcliffe, regard this class of causes as the sole indication for treatment, I am satisfied that the state of the blood need not necessarily be impoverished, but that various pathological conditions of the blood may be associated with epilepsy. Upon no other view could we understand the very successful result of the treatment pursued by Dr. Prichard, which consisted mainly in the abstraction of blood not only on the derivative plan but on the ground of diminishing the actual amount of blood in the system. His cases are well told, and from the description of his patients, who all seem to have been florid, robust country people, the reader will probably agree with us that the treatment was sensible." The statement, however, made above requires some qualification and explanation. When Dr. Copland affirms that Epil. Plethorica or E. with determination of blood is the most common form, I do not admit what he presently adds, that such cases "betray increased vital action," for it appears to me that the very excess of blood, whether local or general, acts injuriously, disordering and deranging the due nutrition of the nerve-cells. In the normal state the power of the tissue should hold the upper hand and regulate the blood flow, so that while the organ receives a sufficient supply for its necessary pabulum during the period of active exertion, it may not be oppressed by a larger amount than it is able to deal with when its energy declines and an interval of repose becomes necessary. A strong organ, say a powerful brain, can receive and employ beneficially a much larger amount of blood than a weak one. What would be an oppressive and injurious hyperæmia to the one is no more than an adequate support for the other. I can well conceive, therefore, that an encephalon whose nerve power is originally weak and unduly excitable, and which has very probably been still further deteriorated by the unrestrained indulgence of passion and by various unhealthy excitements, may be very intolerant of an amount of blood flow which a stronger and better trained brain would find nowise injurious. The real defect in cases of this kind is in the nerve-tissue and not in the blood.

Our next topic is the Pathology of Epilepsy. It is to be borne in mind that of the several nervous centres which make up the encephalon, only the medulla oblongata, the pons, and the tubercula quadrigemina are capable, on irritation, of giving rise to convulsions. The corresponding condition of the hemispheres seems to be delirium.

It is generally admitted that the essential change in Epilepsy is purely functional, that if we could examine the several organs of a sufferer at an early stage of his malady, we should be unable by any scrutiny in our power, to detect any lesion whatever. This applies, probably, to the great majority of epileptics; but there is no doubt that lesions are sometimes found within the cranium, which act evidently as causes of irritation on the nervous centres, as well as others, which are solely consequences of repeated paroxysms. The latter consist of punctiform or more copious extravasations of blood, of dilatations of vessels, exudation of albuminous fluid which causes induration of the nervous tissue, subsequently, it may be, passing into fatty degeneration and softening. From Schr. v. d. Kolk's researches it appears probable that these changes, or at least the vascular dilatation, are most advanced in those nervous centres which are the seats of especial disorder. Thus, in epileptics who constantly bite their tongues in the attacks, "the irritation and vascular dilatation are more decided in the track of the hypoglossus and the corpus olivare; in epileptics, on the other hand, who never bite the tongue, these changes are better marked in the course of the vagus" (roots of). These same kind of changes have long been described as occurring in the cerebral hemispheres, both in the medullary substance and in the cortical. Wenzel affirmed that the pituitary body and the pineal gland were the especial seats of morbid change in Epilepsy, the former being always found diseased, and the latter commonly, and that when nothing else morbid could be found in any part of the brain. (Sieveking.) Rokitansky, however, makes opposing statements, and I think when we consider the manifold conditions under which Epilepsy prevails, we can scarcely regard it as probable that any special lesion is constantly present.

Looking to the results of morbid action for evidence as to the parts which are most concerned, we must distinguish the hemispheres and the medulla oblongata as the chief foci of disorders. The same is affirmed by the prominent symptoms, convulsions, and unconsciousness. Of the two named centres the former has been regarded by most recent writers as the especial seat of the deranged action.

Schr. v. d. Kolk writes "that we have sufficient reason to conclude that the first cause of Epilepsy consists in an exalted sensibility and excitability of the medulla oblongata, rendering the latter liable to discharge itself on the application of several irritants which excite it in involuntary reflex movements." Dr. Reynolds, in his article 'Syst. of Med.,' takes nearly the same view. On the other hand, Dr. Wilks, in a masterly paper in the 'Guy's Hosp. Rep.,' 1866, expresses his opinion "that from clinical and post-mortem observations, as well as from all analogy, we cannot but conclude that the *fons et origo mali* is in the cineritious substance of the brain." He believes that "in true epilepsy there arises in the superficial parts of the brain an influence which is independent of the will, and, in fact, takes away the consciousness by operating through the cineritious substance, and which also irritates the ganglia below, and sets up the paroxysm. At the same time we may allow that the pons Varolii, and the medulla oblongata, also are excited; and we may thus explain the affection of the respiratory nerves, and of the spinal accessory which causes the distortion of the head." (P. 228.)

For the former view the chief arguments seem to be the non-production of convulsions by irritation of the hemispheres, the especial implication of the nerves implanted in the medulla, the experimental proof given by Brown-Sequard, that no part of the encephalon is necessary for the production of epileptiform convulsions, except the medulla and the pons Varolii, and the occasional occurrence of Epilepsy without loss of consciousness. On the other hand, Dr. Wilks points to the common occurrence of epileptic attacks as the the result of old standing adhesion of the membranes to the convoluted surface of the brain, to the frequency of attacks of epileptic vertigo (petit mal) with suspension of the function of the hemispheres (unconsciousness), but no, or very slight, convulsion, to the co-existence of epileptic fits with the form of insanity termed general paralysis, of which the essence appears to be a chronic inflammation of the grey convoluted surface, and its investing pia mater, and the tendency of the disease to terminate in imbecility. On weighing these statements one almost feels inclined to exclaim—"Non nobis tantos inter componere lites." However, it seems clear that the medulla oblongata, with the pons, and the hemispheres, are the parts chiefly engaged in the morbid action; and it does not appear improbable that the special derangement may commence in either. In the ordinary convulsive paroxysm it seems very possible that the unconsciousness may be the result of the extreme nervous disturbance in the medulla, which, through the commisural fibres, communicate a kind of shock to the superior centres. This opinion seems to me warranted by Fabre's case, where an effusion of blood in the substance of the left anterior pyramid was the sole lesion discovered in the brain of an old man who died of an attack of apoplexy accompanied with complete loss of consciousness. I am the rather inclined to this view because one certainly observes occasionally an alternation or extension of morbid action from the convulsion-producing centre to the intellectual in the same patient within a short time, convulsions appearing to be the equivalent of delirium. This is very much what one might expect, both are evidently conditions of morbidly excited action of nerve-cells, but in parts of different endowments. The same process differently located expresses itself differently. In the epileptic fit, however, the convulsion does not coincide or complicate itself with delirium, as it probably would were both medulla and hemispheres involved in one morbid process, but with an almost opposite state which it is very noteworthy usually outlasts the convulsions for a more or less considerable time. When delirium or mania occurs in connection with epilepsy it is mostly, I believe, as a sequel of the paroxysm, supervening when the convulsion has ceased and after a period, though perhaps a brief one, of stupor. I am aware, however, that it sometimes precedes an attack, or may occur between two, or may to a certain extent replace convulsive seizures which are in some measure abortive (Falret). In such cases as these I think it very probable that the hemispheres are implicated in the *same* process which gives rise to the convulsions, and may constitute its primary seat.

In the 'petit mal' the hemispheres are certainly the parts most evidently affected, but the medulla oblongata is not altogether exempt. In those cases where more or less prolonged giddiness without complete unconsciousness is one of the manifestations of epilepsy we must consider the seat of the malady to be rather in the mesocephale than in the hemispheres.

It seems to me almost impossible to determine what is the primary seat of disorder, and for the present I am disposed to conclude only that the chief focus of epileptic disturbance may lie in the medulla oblongata and pons (convulsion without unconsciousness), or in the hemispheres (petit mal), or in both (grand mal), or in the tubercula quadrigemina and adjacent parts (vertigo), other centres in each case being affected in a minor degree.

It seems quite hopeless to attempt to discover by microscopic examination or in any other way the state of the nerve-cells which gives rise to epilepsy. Could we indeed contrive an endoscope that would show us the living cells *in sitû*, and could we obtain an observation during the convulsive period, we might perhaps behold in the rapid disorderly movements of the molecules contained in the cells a visible indication of the perturbed state of the forces generated in these living laboratories. But even if such a dream were practicable I doubt whether we should be wiser for any useful purpose than we are at present. We know that the nerve-cells which are concerned in causing the convulsions of epilepsy must be in a state of functional derangement, which we describe imperfectly yet correctly as one of *hyperexcitability*. By this term I understand that the cell machinery instead of acting in a regular orderly way in due response to appropriate stimuli behaves in an altogether contrary manner. That such should be occasionally the case appears to me by no means surprising. If we consider the matter it cannot but seem to us wonderful that in the healthy state the several living cells, nourishing themselves out of the blood by their own attraction of appropriate matter, should maintain so steadily their molecules in a state which on slight excitement readily undergoes such change as is propagated continuously along the axis cylinders of motor tubules, and again ceases so speedily and passes into quiescence. The due and orderly evolution of the requisite amount of force in each cell, and the limitation of the excitement of the active state to certain cells, while others close by remain quiescent, imply assuredly a wonderful delicacy of arrangement. Had we to contrive the construction of a living body, methinks one of the most difficult problems would be to provide for the evolution of force in such a way that it should be always at hand, and sufficient, and never excessive. In our dealing with physical forces we often find to our cost the difficulty of managing this. Our steam boilers burst, our cannon blow their breeches out, our time-pieces go too fast or too slow, our gun cotton and nitro-glycerine can hardly be manipulated or stored safely. If these coarse physical sources of power are so difficult to regulate and keep under control can we wonder that the same is true of their vital analogues? If nitro-glycerine sometimes explodes spontaneously, why should not cerebral neurine do the same in its way? These are it is true but vague analogical reflections, yet they may aid us in conceiving how liable nervous centres are to derangements in their working, and in lessening the tendency of our minds to look for an evident disturbing cause in every case. Mere failure of regular nutrition may suffice to generate the most stormy outburst of perverted action.

As to the precise *nature* of the nerve disorder in Epilepsy we can say very little. I do not see that we gain much by separating the reflex faculty into two elementary vital properties, viz. reflex excitability and reflex force, the former of which Brown-Séquard regards as being always in excess, while the latter may be diminished. At least I think this distinction does not prove applicable to the case of epilepsy. The spasmodic contractions are not in the great majority of instances of truly reflex character, even when a cause of irritation exists outside the nerve-centres. This cause generates the peculiar state of the nerve-cells which conditionates the outbreak, but in so gradual a manner that there is a wide difference between an ordinary reflex contraction ensuing on application of a stimulus and those taking place in an epileptic seizure. In the choreic, hydrophobic, or tetanic patient, the reflex susceptibility does appear to be notably increased, but not in the epileptic, whose condition at any rate during the attack is rather characterised by insensibility to ordinary impressions such as that of light on the pupil. In the mimic disease hysteria there is much more manifestation of reflex excitability, but in epilepsy all such faculties seem to be merged in an overwhelming perturbation of central origin. There is no doubt that the change in the centres which conditionates epilepsy is very often induced by the operation of enfeebling causes, and that in all most essential and important respects the disease consists in a degradation, an impairment, and not in an increase of functional activity. Of course there is a great putting forth of nervous and muscular action, just as there is in fierce delirium, between which and the convulsive disorder there is a great resemblance, but in both cases the true functional power of the organ concerned is utterly lost for the time; and though after the paroxysm has passed by the organs before long recover their lost faculties more or less completely, yet recurrence of the seizures tends too frequently to convert the temporary deprivation into a permanent one.

But though the close relationship of Epilepsy with conditions of impaired nervous power seems to me the more usual event, it must not be overlooked that it often exists where none such are apparent. Fifty-six per cent. of the Epileptics examined by Dr. R. Reynolds were in perfect health of body, and in some the physical health and strength were above the average. In the majority of these we must believe the nervous power was in general better than it is in a multitude of weakly hyperæsthetic people who have no Epilepsy. It is, however, I think, quite certain, from what is observed in the asthmatic, that an infirmity of some part of the nervous system may co-exist with considerable general and intellectual power. An Epileptic, therefore, we can well understand might possess originally a well organised nervous system, barring this one fatal defect. Looking however at Epilepsy from the widest point of view, viz. that afforded by a study of its causation, it seems unquestionable that its most evident causes are those which impair and deteriorate nerve power. If there are many cases where none such can be found, this does not weaken the force of those where their influence is incontestible. Rather it seems to me to lead us to the conclusion that failure and derangement of vital action may ensue as it were spontaneously, and without any direct exciting cause.

The paroxysmal character of Epilepsy aids, I think, often to mask the disordered state on which it depends. It is a well-known peculiarity of the nervous system that though under the constant influence of a morbid agent it does not by any means always resent its presence by continued expressions of distress, but functions on apparently in a normal manner for the greater part of the time, and only at stated and often most regularly recurring periods lapses into demonstrative disorder. Trousseau relates the case of a lady who had uterine cancer, and suffered every day exactly at the same hour frightful pain, which lasted from 3 to 5 hours, and then ceased till the following day. In Epilepsy there is no periodicity, but we know very well that this is of no material importance, and that paroxysms exactly resembling those of the so-called essential malady may be dependent on the presence of some permanent irritation. This, of course, must be always in operation, but it is only at times that the resisting power of the nerve-tissue succumbs, and the morbid action replaces the normal. The same may be said of saturnine and malarious Epilepsy, where the irritating agent is a poison. In all these cases, and I do not think essential Epilepsy forms any exception, the nerve-centres must be constantly in a more or less unnatural state, which culminates now and then in an outburst of disorder. The actual existence of this unnatural state, though it is often latent, seems to me strongly affirmed by those instances in which the very same causal condition does generate permanent phenomena. Thus a tænia in the intestines causes paroxysms of convulsions in one case, in another continual giddiness, in another paralysis, in another incessant cough. Can we doubt that in all these alike there is derangement of nerve power, though in the first, owing to some peculiarity of which we cannot judge, the outward and visible expression occurs only at intervals?

The records of hereditary transmission of disease appear to furnish very significant information respecting the true nature of Epilepsy. Insanity in some of its forms, idiocy, deaf-mutism, hysteria, neuralgia, hypochondriasis, locomotor ataxy, scrofula, and various malformations are its recognised congeners, so that if one member of a family be Epileptic, there is a decided probability that one or more of the other members will suffer in one or other of the above-mentioned ways. Of course the instances are numerous where Epilepsy occurs alone in one person without any liability to cognate disease in his kindred, but where other affections do occur they are of such a kind as strongly mark the failure of constructive power, the defective developmental energy.

In attempting to give a *rationale* of an Epileptic paroxysm, let us assume that a derangement of nerve function arises in or is communicated to the medulla oblongata, comparable ("sic parvis componere magna solebam") to the sudden irritation which affects the sensory nerves of the nasal cavities in some part of their course just before a sneeze.[1] When this attains a certain extent and intensity, it necessarily gives rise to general convulsions, just in the same way as an involuntary contraction of expiratory muscles occurs in sneezing. At the same moment that the convulsions occur, and in consequence of the same morbid impulse, the vaso-motor nerves of the head and face produce constriction of the arteries, and hence the sudden pallor. The unconsciousness is not, however, I conceive, the result of this anæmiating spasm, as many excellent authorities regard it, but of a shock communicated to the hemispheres in consequence of the violent disturbance set up in the medulla and pons, as I have already stated. My reasons for dissenting from the view more usually held, and which I took myself in the first edition are—(1) that the spasm to produce the complete unconsciousness must be universal and extreme, which seems rather much to assume for all cases; (2) that persons may be apparently dead, deprived of respiration, circulation, motion, and visual power, and yet retain consciousness and the faculty of hearing what is said by those about them, as they have testified on recovery; (3) that wild animals have been known to run some good way after circulation must have ceased. A sportsman told me that a deer he shot ran 180 yards after its aorta had been severed by a bullet, and Dr. Livingstone states that a waterbuck will run (he does not say how far) after a part of its heart has been blown out by one of Jacob's shells. Men pulseless in cholera are well known to have often perfect use of their intellectual faculties and motor powers; (4) that the unconsciousness long outlasts, in many cases, the suspension of the circulation and the breathing, which from K. and T.'s experiments we should think would not be the case. In some cases, it is difficult to say in how many, the starting-point of the paroxysm must be in a lower part of the cord than the medulla oblongata. When an aura, painful or convulsive, occupies some seconds in travelling upwards towards the head it seems to me most probable that until the special phenomena commence the superior centres are not engaged. The primary morbid change takes place in the tertiary centres of the cord, or possibly still more peripherad in some of the nerves implanted in them, and is propagated upwards as impressions usually are. So long, however, as there is no sign of general convulsion, or loss of consciousness, so long as the aura can be perceived by the patient like any other sensation, I cannot think that the medulla oblongata or hemispheres are drawn into the sphere of morbid action. In fact, cases of partial Epilepsy prove that an aura may be the primary and only symptom, the attack remaining abortive. As the aura is sometimes, perhaps often, latent or unfelt, it is difficult to say to what proportion of instances the above remarks apply.

---

[1] Hovius speaks of "sternutatio" as "proximus epilepsiæ affectus," and Gabucinus says that it is "maxime affine" ad "comitiale malum." Quoted by Reynolds, p. 52.

In its progress upwards from its starting-point the original nerve disorder becomes, I conceive, greatly intensified, owing to the anatomical arrangement of the centres. Each cell must be linked by commissural fibres to others in the next highest centre; and as the number of cells is far greater in the basal ganglia than in the medulla oblongata, and in the hemispheres again far greater than in these ganglia, an irritation as it ascends and diffuses itself becomes greatly magnified. The cells predisposed to disordered action may be compared to inflammable material, and the irritation reaching them to a lighted match, the application of which produces results that depend much on the quantity and quality of the combustible matter (Sieveking).

When the hyper-excitability of the cells of the medulla oblongata and mesocephale is exhausted the convulsions cease, but the shock which has been communicated to the hemisphere is usually felt for a much longer period. I regard it as a matter of practical importance to understand that the coma or sopor following the convulsions, and continuing perhaps for several hours or days, is simply the result of shock, of an internal concussion, as it were, and not at all of hyperæmia. The latter may indeed exist, and be very marked on the exterior of the head in consequence of the vaso-motor paresis, which naturally succeeds to the primary spasm. It may even call for treatment lest it should produce additional mischief; but it is not, I am persuaded, the cause of the coma. From not considering this matter sufficiently, I was once led into the great error of bleeding a man who had been lying many hours in a state of stupor and speechlessness, although his circulation, which at first was much depressed, had regained full activity. The result was to convert occasional attacks of epileptic vertigo, or of leipothymia, into continuous convulsive paroxysms which proved fatal. The coma, or cerebral numbness as we might term it, which commences in and outlasts the convulsive period, differs much in its degree in different subjects, sometimes being of short, at others of long duration. This no doubt depends on the varying recuperative power of the hemispheres, which in some persons is much weaker than in others. In certain individuals the stupor is exchanged for an apparently opposite condition, viz. maniacal delirium, or cerebral hyperæsthesia. The affinity existing between these two conditions in peripheral nerve organs has been already pointed out, as well as the analogy between the derangements of the lower and higher centres, so that the occasional substitution of delirium for coma cannot surprise us.

Another sequel of the epileptic paroxysm is hemiplegia. This I interpret as depending on a state of the corpus striatum quite similar to that existing in the hemispheres during coma, viz. functional paralysis. Dr. Todd regarded it as one of white softening, but though I agree with him as to the impaired and depressed nutrition of the nervous centres involved, I cannot think that any actual organic alteration takes place, as the paralysis may be of short duration. The following case is of interest in more than one respect:

CASE 7.—J. S—, æt. 27, had two fits July 30th, 1867, and was admitted August 3rd, stuporous and with left hemiplegia. Motor power in the affected limbs was entirely lost, but sensory appeared perfect. The muscles of the arm responded well to faradization; those of the leg not quite so well. He passed all his evacuations in bed. His countenance was deficient in intellectual expression, and was suggestive of insanity. He had been acting as a keeper of insane paupers. The arm began to regain power August 9th, and had pretty well recovered by the 14th. The leg remained motionless except on tickling, which produced reflex movements on 17th; soon afterwards it also improved, and its power was nearly quite regained by 31st. The urine at this date deposited phosphates copiously, as it had done most of the time previously, and contained a very large amount of carbonate of ammonia, proceeding, no doubt, from decomposition of the urea. The total amount in 24 hours was 61 oz., sp. gr. 1017; the total urea, exclusive of that which had decomposed into ammonia, was 475 grains. On September 14th, when he was nearly quite well, the total urea was 314 grains, and the deposition of phosphates had ceased. He went out quite well. He was treated throughout with tonics, Ammon. Carb., with Tr. Cinchon, and Valerian, Strychnia, quinine, iron, and port wine, besides small stimulant doses of camphor and opium. The tendency to spontaneous decomposition of the excreta in cases in states of depressed vital power, has been ably dwelt on by Dr. Inman; and I took the breaking up of the urea as a further token of the general prostration which the epileptic commotion had occasioned. Simultaneously with the complete restoration of nerve power, the urine became quite natural, and, what is especially worthy of attention, the total urea of 24 hours diminished considerably. The difference cannot be accurately stated, but it is certain that it was more than 161 grains. The state of my patient *quà* nerve power was very comparable to that of a fever patient in whom the excretion of urea and uric acid during the height of the fever greatly exceeds that which takes place during convalescence. Nervous paresis in both conditionates excessive waste. The subject of the foregoing case was a weakly individual, and the epileptic shock affected his nerve-centres rather extensively. Hemispheres, right corpus striatum, and the regulating centres of the renal plexus were all involved.

Sometimes the articulating centre alone is paralysed, as was the case in a boy under my care, who remained aphonic for many days after epileptic fits, though he was quite conscious and intelligent, and was able to put out his tongue. Another and much more serious sequel, which, however, is rare, is palsy of the medulla oblongata and other respiratory centres, of which the following seems to me an instance.

Case 8.—J. W. W—, labourer on roads, had his first fit 9 months before his admission, February 22nd, 1869. Attacks recurred February 13th, 19th, 20th, 22nd, and 24th. Bromide of Potassium was given, and he had only 2 in March, one on April 2nd, and the last April 5th. It occurred at 6.30 a.m. while he was at work. When I saw him about 2 p.m. he was moribund, his pulse 150, temperature 102°.3, respiration about 50. He was quite insensible, the body was curved to the right, the left side was rigid, but there were convulsive movements of the right side, the leg, arm, face, and eye. The urine was not albuminous on February 22nd. At the autopsy the encephalon presented nothing abnormal, except a little thickening of the arachnoid, the spinal cord appeared normal, and so did the bones of the cranial cavity. The arteries of the brain were full of dark blood. I examined the medulla oblongata and part of the pons microscopically, but found no granule cells, or other morbid change. The lungs were very much engorged. The kidneys were quite normal. The intestines contained no worms.

I had expected to find some hæmorrhage in this man's brain, but failing to meet with this or any other evident cause for the fatal coma, I conclude that the respiratory centres were paralysed, just as the voluntary motor occasionally are, and thus arrest of breathing and coma occurred. The rapidity of pulse indicates paralysis of the vagi, and the elevation of temperature (fully 3° F.) paralysis of vaso-motor nerve centres. The hemispheres were involved in the paralysis, which seems to have been general, except on the left side of the encephalon.

Another occasional result of the convulsive paroxysm is hæmorrhage. A boy, æt. 13, under my care, always brought up blood in 20 minutes after the fits; it also came from his nose and ears. What was very remarkable was that the hæmoptysis came on first a few days before he had a fit in consequence, it was said, of a strain, and at a later period occurred twice without fits. Ecchymotic spots of smaller or larger size, and more or less widely diffused, are pretty often found on the cutaneous surface after a paroxysm, and similar extravasations sometimes occur within the head in the membranes or substance of the brain. It is possible that these alterations may depend in part on passive congestion produced during the interruption of the breathing; but I cannot think this is their chief cause, and am much more disposed to refer them to vaso-motor nerve paralysis impairing, as we know it does, the texture of the capillaries.

Similar extravasations occur in heat-stroke. In rare instances the intra-cranial effusion is copious, and constitutes a very dangerous complication.

The only other phenomenon which I need notice is the Aura. Though it is observed in some cases where a cause of direct cerebral irritation exists, I cannot but think that for the most part it has its origin in some part of the peripheral nervous apparatus consisting of the spinal centres and their implanted nerves;—not only because it is sometimes very local, or is capable of being arrested in its progress upwards by a circular blister, or tightened ligature, or by preventing, in the case of a motor aura, the crampy contraction; but on the ground of Brown-Séquard's discovery that cauterization or destruction of the skin or mucous membrane may arrest the attacks and cure the disease, while irritation of the divided nerve trunk will not induce the paroxysm.

At its commencement, then, the aura is no more than any other common nerve disorder, an itching or a neuralgia. But what specially characterises the aura is, that while these remain limited to their first seat, or only extend gradually to other peripheral nerve tracts, its morbid action propagates itself rapidly upwards towards the highest centres. There can be no doubt, I think, that this propagation takes place in the grey matter of the spinal cord, the change spreading along it from one nerve-root to the next above it, and the resulting sensation being, of course, referred to the peripheral extremity of the affected nerve-fibres. On no other view can we account for the transference of the morbid sensation from its starting-point to parts of the surface nearer and nearer to the head, unless indeed we believe that the fibres of a nerve are not merely juxtaposed, but blended in their course. The same view applies completely to the case of a motor aura. The term "intellectual aura" is applied to those cases where the first indication of the impending attack consists in the recurrence of some scene to the memory, the same mental impression being repeated on each occasion. Trousseau relates the case of a youth, æt. 17, the subject of hereditary taint, who had his first fit at the time of his mother's death, which distressed him greatly. Subsequently this painful event invariably recurred to his mind at the commencement of his attacks, and he used to say, "It takes hold of me by my thoughts." This intellectual aura must have its seat in some part of the hemispheres, and the derangement of innervation must then be propagated downwards to the medulla oblongata before the convulsion sets in. Visual, olfactory, or auditory illusions may also constitute auras, whose primary seats are the ganglia of these special sensory nerves. When the paroxysm, as in partial Epilepsy, consists of the aura alone, we may believe that the superior nervous centres retain their natural resisting power, and refuse to be drawn into the sphere of morbid action. In all cases it appears to me that a distinction must be made between the conscious apprehension of the premonitory change which constitutes the aura, and the extension of this change to the great nervous centres themselves. The cerebrum may be quite conscious of the existence of the aura, whether it begin externally or in its own substance, but so long as consciousness continues it is not actually involved in the morbid action.

The affection of the medulla oblongata is much less in the petit than in the grand mal, but there is nevertheless ample proof that it does not usually escape. In the majority of cases of Epilepsia mitior, according to Dr. Reynolds, some evident spasm, though varying much in extent, exists. The unconsciousness is mitigated proportionally to the convulsion, a point which is worthy of remark as indicating the dependence of the former in great measure on the latter. The connection between the two forms of paroxysm is so close that I can hardly conceive the mode of production to be different. The occurrence of an aura is less frequent in the petit than in the grand mal, but Dr. Reynolds has met with more than one instance in which it was highly marked and most painful, and we may well believe there are numerous instances in which an aura exists, but is unfelt. A sufficient reason may, I think, be assigned why in seizures of mitigated severity the convulsion-producing centre should be much less affected than the intellectual. It is a remarkable feature in the life of the medulla oblongata that it never sleeps, but day and night continues to preside over the respiratory movements with unwearying care from the first gasp to the last. The hemispheres, on the contrary, must cease their toil, abandon their function, and recruit their energy by sleep-repose several hours in every 24. Must we not conclude that the cells of the former centre possess a much more enduring energetic life than the cells of the latter, and may we not well believe that they are capable of resisting injurious influences to which the others succumb?

We may compare the two forms to the complete ague fit and the dumb ague, which latter, in its frequent imperfect returns, and the more serious ill-health which it implies, has much resemblance to the petit mal. Dr. Sieveking correctly, I think, regards minor Epilepsy as indicating a more decided and persistent debility or lesion of the cerebrum than exists in convulsive.

In those attacks which resemble syncope I believe arrest of the heart's action takes place in consequence of irritation of the vagi at their origin in the medulla. Brown-Séquard has explained in this way the fatal effects of extirpating the "nodus vitalis," and states that this effect is done away with by division of the vagi nerves. Death is caused in the same way, I think, in some cases of laryngismus stridulus.

The *treatment* of Epilepsy involves—(1) the removal by medicinal or surgical or hygienic measures of all conditions which may generate or maintain the morbid excitability of the nervous centres; and (2) if no such causal condition can be discovered, which is the most frequent case, medication directed to lessen and remove this same state, which we are then obliged to consider as diathetic or primary. Such measures constitute the radical treatment which has for its object the prevention of the seizures. During the attacks themselves, when they are unusually prolonged and severe, we are also called upon to interpose with remedies to mitigate the perils which they induce.

Under the head of Etiology I have already adverted to nearly all that is necessary to direct us in the removal of existing and operating causes. I will only add here some notice of the results of trephining. This is an operation which does not give brilliant results in cases of injury to the head, but may be reasonably expected to be more successful when undertaken for the relief of epilepsy, inasmuch as there is no immediately life-perilling lesion of the encephalon or its membranes.

An American writer, Dr. Pillings, has collected 72 cases of epilepsy resulting from an injury to the head where the trephine was used. Of these 16 were fatal, 42 are reported as cured, 4 unchanged, and the remainder improved, but not entirely relieved. ('Year Book,' 1861, p. 245.) Markol also records one successful case. Hasse does not adopt exactly Tissot's recommendation that we should trephine whenever other measures fail, and that if one hole in the skull does not serve the purpose we should make several; but he remarks that the numerous cures which have been obtained by this operation, and by injuries to the cranium destroying a part of its bony wall, urgently demand a resort to this measure whenever it appears to be rationally indicated. The great objection to trephining seems to be the uncertainty of our being so fortunate as to hit the exact spot where the cause of irritation exists. Few patients I fear would be so compliant, and few doctors so persevering, as the famous German count and his advisers, of whom Dr. Sieveking records, that their patience and diligence were not crowned with success till the 27th application!

As examples are to my mind much more satisfactory than general statements, I subjoin two instances in which the good effect of the operation was very striking. In both, however, the site of the operation was definitely indicated. The first is that of an epileptic boy under the care of Mr. Travers in St. Thomas's Hospital, whose cranium presented a depression which was tender on pressure. The trephine was applied, and the concave portion removed; on raising it a violent epileptic fit followed, but it was the last. From the inner lamella an osseous spiculum projected about an inch in length which compressed the dura mater. The other case is related by Dr. Hayward ('Amer. J. of Med. S.,' 1838, vol. 22, p. 517).

Case 9.—Q. S—, æt. 41, married. In 1825 he had scrofulous abscesses, one of which formed about 2 inches to the left of the sagittal suture, and just behind the coronal. A piece of carious bone came away of the size of the top of a common thimble, and in about a year from its commencement the ulcer healed, but his health was left very much impaired. During the existence of the ulcer he had neuralgia of the left side of the face, pain in the left eye and some loss of vision, and luminous flashes and spectra occasionally. Immediately after the ulcer healed fits of an epileptic character occurred every night or every second night. Since the commencement of the disease of the head he was never free from a dull, heavy, distressing feeling in the head, as if from the pressure of a leaden cap, always referred to the cicatrix as its centre. Besides the complete fits he has very often had partial fits in which there occur universal spasms with a confused bewildered feeling without loss of consciousness. These fits and spasms have been frequently induced by mental excitement, sudden jars, and unexpected loud sound, and much mental emotion would at any time bring on severe pain and distress about the cicatrix. During the whole time he has frequently been much annoyed by an excessive secretion of very pale urine, sometimes to the amount of 2 or 3 quarts in 24 hours, with frequent micturition. This has occurred both immediately after a fit and also in the interval. As his health improved the fits became less frequent, until the last year, when they were more numerous. For the last 10 years his health has been quite good excepting after the fits, from which he has recovered but slowly, and excepting also the constant sense of pressure in the head. On March 20th, 1838, 6 ounces of blood were taken with instantaneous relief of pain and heaviness, the head feeling much lighter than it had done at any time during last 13 years. This relief did not last long, and on 24th trephining was performed and a piece of bone removed at the situation of the depressed cicatrix. This piece was easily detached from the dura mater, except at about its centre, where there was an adhesion of the membrane to a short, delicate, bony projection. The removal of the bone gave instantaneous and complete relief to the sense of pressure, the patient declaring while on the table that he had not felt so well for 13 years. The dura mater appeared perfectly healthy. In spite of an attack of erysipelas he recovered well, and about 2½ months later, when the report was drawn up, he had continued quite free from all his former symptoms, except some dull heavy pain in the head, never of long continuance, which ensued on any protracted effort of attention.

It is unfortunate that we have no further information as to the permanency of the cure in this case, but it is evident that the operation was highly beneficial. A case has lately been recorded by Dr. Kinhead in which the patient, a woman, æt. 70, who had been epileptic 10 years, the fits occurring about once a month, fell into the fire, and injured her skull to such an extent that the entire calvarium exfoliated and came away. From the time of the accident to the date of the report, 3 months or more, no fits recurred, nor were there any cerebral symptoms ('Med. Press and Circular,' 1869, Jan. 20th). The following history, recorded by Dr. Skae ('Edin. Med. J.,' 1866, Feb., p. 684), is of much interest in regard to the effect of trephining, and several other points :

Case 10.—Mr. D—, æt. 24, of strictly temperate habits. Seven years ago, in India, he had a fall and injured the left side of the head, but nevertheless remained with his regiment 5½ years. When he came home he appeared quite well, and continued so for a year. He then had his first attack, consisting of many severe epileptic fits, followed by a paroxysm of excitement—this was exactly 6 months before his admission into the asylum. He was brought to the asylum in a very violent paroxysm of acute mania, which had lasted 2 days, and had commenced immediately after a series of very severe epileptic fits. At this time he was so violent that he had to be put in a padded room. During the 6 months between his first attack and his admission he had regular monthly attacks consisting of a series of fits followed by great excitement lasting 3 or 4 days. For some days after admission he continued in almost incessant rotatory motion from left to right, whether he was sitting or lying; his eyes usually open, fixed in a glassy stare; his movements were all automatic, the hand of another was grasped if placed in his, he moved away if any one stood in front of him; every night at 10 p.m. he took some food, but manifested no consciousness whatever; he continued for 10 days in exactly the same condition, then slowly and gradually recovered consciousness; the regular rotatory movements ceased. For some days he was unable to get up owing to the severe bruises he had sustained in his violent movements; in a few days he was to all appearance perfectly well, but complained of a good deal of uneasiness on the left side of the head at the site of the injury. Two months after this, having continued quite well in the interval, he had 7 severe epileptic fits, followed by a maniacal paroxysm which lasted a week, when he was again apparently well. It was noticed that pressure on a certain part of the left side of the head gave pain and induced involuntary contraction of the muscles of the arm on the opposite side. The history of an injury whose position was indicated by a cicatrix, the pain or at least uneasiness *constantly* felt and aggravated before a paroxysm, the peculiarity of the movements in the maniacal state, the pain and twitching in the right arm produced by pressure on the site of the injury, all pointed to the existence of some local structural change probably seated in the bone or subjacent membranes, and to the *possibility* of relieving a probably hopeless case by trephining over the site of the injury. The result of trephining (which was performed by Mr. Syme) may shortly be stated thus—that while previously the patient was subject to a regular monthly recurrence of a series of severe epileptic fits, accompanied by a maniacal attack of great violence—since that time, although the epilepsy still continues, the maniacal attacks have become less frequent and violent every succeeding year, and during the last 3 years there has been no *maniacal* attack at all. On one or two occasions when exposed to annoyance or excitement he showed an uncontrollable impulse to strike or commit some violent act, but this excited condition, during which he was apparently only semi-conscious, lasted but a few minutes. With these exceptions he is perfectly sane. The circular piece of bone removed by the trephine was in one of its halves thicker than the other, and its vascular grooves on its under surface shallower.

We may remark in this case—(1) the length of time intervening between the injury and the setting in of disorder; during more than 6 years the modification of the encephalon conditionating the paroxysmal manifestations must have been slowly generated; (2) the intermittency of the effects, the cause remaining constant; (3) the existence of rotatory movements, a species of vertigo, showing the affection of some nervous centre distinct from the medulla and hemispheres; (4) the good effects of trephining, developing themselves more and more as time passed on. As no bony prominence was found in this instance we must rather refer the relief obtained to the removal of general pressure than of local irritation, and the preceding case seems also to point to the same conclusion.

Counter-irritation is a measure which may often disappoint us, but yet ought not to be altogether put aside. Romberg advises in suitable cases to make a crucial incision in the scalp down to the bone, and to maintain suppuration in the wound. Schr. v. d. Kolk relates a case of successful result after the disease had greatly impaired the mental powers from making a transverse section of the scalp at the vertex, and keeping the wound suppurating for a long time by the insertion of peas. He also records an instance of the marked good effects of the actual cautery applied to the head. Brown-Sequard has employed the same means with great advantage. My own experience of the actual cautery in a case of myelitis would not incline me to rate its influence more highly than that of a seton or repeated blister. I think, however, the occasional application of a disk, heated to 212°, to the nape of the neck may be very serviceable. It is of great use in some cases of sciatica. Other derivatives have positive testimony in their favour. V. der Kolk affirms that by such means he has succeeded in curing some old and desperate cases. Romberg states that a seton in the neck, maintaining suppuration for a series of years has repeatedly, in his experience, improved the physical and intellectual condition of the patient, diminished the frequency of the paroxysms, and, in a few instances, obtained a permanent cure. Dr. Sieveking writes to the same effect. He also states that he finds great advantage from dry cupping in patients where the approach of a seizure is announced by symptoms of active congestion, and recommends that a convenient little apparatus he has invented should be in readiness. It often gives great and instant relief. Dr. Laycock advises the use of sternutatories, of which snuff is probably as good as any. This is a handy means, and I can well believe it may ward off attacks, as he has found it do. The formula he recommends is Pulv. Cinchona ʒiv + Pulv. Hellebori albi gr. xl. M. ft. pulv. a small pinch to be taken *ter die*. The above testimonies cannot be slighted, but there can be no doubt that an indiscriminate use of counter-irritants can only lead to disappointment. They are unsuitable to cases where asthenia and exhaustion are very marked, to those where we suspect intra-cranial lesion, and also to those of great general hyperæsthesia.

As to Depletion, while I think the cases are rare in which it is advisable, I would ask those who altogether exclude it from their list of remedies to peruse the cases related by Drs. Prichard and Parry, and then to say whether they do not afford ground for similar measures in patients whose pulse and other symptoms (redness of eyes, heat of head, tensive headache increased by lying down) indicate the existence of augmented intra-vascular pressure. The marked advantage of V.S. in many instances of puerperal eclampsia has also an evident bearing upon this question, as well as the results of compressing the carotids. Schr. v. d. Kolk says, "if the patients are at all plethoric, the repeated use of cupping with scarification is very necessary, and is to be preferred to the application of leeches. By this alone I have often seen the attacks remarkably diminished."

Of the efficacy of Purgation we have but little evidence. Hamilton does not include Epilepsy in the list of diseases which he has treated successfully in this way. Nevertheless the analogy of chorea would incline me to expect that in certain cases much good might accrue from this class of agents. A weakening serous drain of course is not desirable, but the effective stimulation of the intestinal glands and follicles to excrete some matter which, if retained, may act poisonously on the nervous system. Podophyllin and Extr. Coloc. Co. are probably as good drugs as any we can employ for this purpose. In the cases I have in view the urine may be clear, pale, and of low density, but not albuminous, while the stools are not evidently morbid; and improvement may coincide with the secretion of red and loaded urine, as Dr. Hunt has well remarked. On the other hand, when the urine is scanty and deep-coloured, the liver engorged, and the circulation in the portal vein impeded, saline aperients will be of much service. Romberg recommends the waters of Carlsbad and Marienbad, followed by the use of sea baths, for the treatment of Epilepsy, depending upon morbid conditions of the liver. He relates a case where the disease came on in consequence of too copious animal diet and want of exercise. Specific treatment was of no avail. "The left lobe of the liver was swollen" and tender, there was obstinate constipation, and the urine was high coloured. Marienbad waters drank 4 weeks at a time for 3 successive years, the cold water cure, bathing, and, we may presume, a regulated diet, effected a cure.

Sedatives, by general experience, are approved as valuable remedies. Morphia is preferable in those cases where life is threatened by the severity and rapid recurrence of the seizures. It need not be withheld even where the urine is albuminous, provided that the peril is evidently from the morbid excitement and consequent exhaustion of the nervous system, and not from stupor tending towards coma. I have employed chloroform inhalation under the above-mentioned circumstances, with, I think, decided advantage, and Trousseau's testimony is very positive as to its good effects in severe cases of eclampsia in children. Sir J. Simpson had long before employed it for the same purpose successfully. Chloroform has also been administered in the ordinary chronic malady by Dr. Reynolds and Dr. Murray. The former reports that it had no power at all to prevent the return of the attacks, the latter seems to have been more successful. (*Vide* 'Med. Times and Gaz.,' 1864, June 4.) I have had myself but scanty experience of its effects when thus used, but what little I have seen would certainly lead me to repeat the trial, were it not for the risk. One death in every 1600 inhalations (as Dr. Richardson tells us) is too serious a peril to face for the possible benefit that might accrue. It may be, however, that the method devised by Mr. Ellis, of inhalation of mixed vapours, will afford so much security that we need not be deterred from repeated anæsthetising. In one exigency, viz., violent maniacal delirium succeeding an attack, I found chloroform inhalation of great value, in fact, it was the only means of tranquillising the patient. For some good while he was very refractory to the anæsthetic, but gradually it told on him more and more, and at last induced continuous quiet sleep, from which he awoke quite rational.

Of other sedatives Belladonna and Bromide of Potassium are the only ones which demand special mention, though Dr. Reynolds speaks favorably of Indian hemp also. My experience of Belladonna, on the whole, coincides with Trousseau's. It does not produce any speedy effect, but, in some instances, if steadily continued, it obtains permanent benefit. The valerianate of atropia has been employed lately by Kroon, Brown-Sequard, and others, and several instances of its beneficial, sometimes curative, effects are recorded. The dose is gr. $\frac{1}{120}$ *bis vel ter die,* increased until some tonic effects are produced. It seems difficult to think that the minute quantity of valerianic acid exerts any influence, nor do I believe that there is any advantage in giving the alkaloid rather than the tincture or extract, provided they are well made. Kroon treated 34 Epileptics, mostly cases of long standing, with Valerianate of Atropia, and states the results as 15 improved, 18 no better, 1 cured. From his observations, he infers that (1) this remedy causes improvement chiefly in cases of long standing, where the prognosis is in other respects unfavorable; (2) in hysterical epileptics it is contraindicated on account of the violent toxic symptoms it produces; (3) it is in general better borne by men than women. The patient whose case is narrated at p. 236 of the first edition, E. C., after the removal of both eyes, which were lost in consequence of prolonged hyperæmia issuing in suppurative inflammation, remained for several months of 1864 without any treatment, and at the end of November was little better than she had been at first in 1861. Fits occurred 2 or 3 times a week, and were more severe than they had been; she had also great giddiness, and violent pain in the head at the vertex succeeding the giddiness. In 1865 she had 8 or 10 fits; 4 occurred before belladonna was recommenced in gr. $\frac{1}{2}$ doses *ter die,* then she passed 96 days or more without any fits. After this the belladonna treatment was interrupted. August 16th she began Calomel gr. $\frac{1}{2}$ *o. n.,* and a tannin mixture, and continued the mercurial till September 28th, slight ptyalism being induced. No attack occurred for 177 days, terminating February 9th. The tannin mixture and Ol. Morrh. were taken till July 11th, 1866, when a bad fit having occurred on July 6th, tannin was given in 7 grain doses with gr. $\frac{1}{2}$ of extract of belladonna *ter die.* In 1866 there were only 6 attacks, some of them slight. In 1867 there was no fit; in 1868 there were two fits, the same treatment being continued, except that the oil was omitted early in January of the last year. The giddiness has greatly diminished, and has been very slight the last 2 years. The mental faculties are but little impaired according to her husband's account. There can be no reasonable doubt, I think, from the whole history of this case, that tannin and belladonna have been of great service. Between 3 and 4 attacks a week, with constant giddiness, and two attacks in the year with only occasional slight giddiness, the difference is very great. If belladonna is to be of any avail, its influence must be persistently maintained for a very long time. A year, Trousseau says, is hardly enough to show what it is capable of accomplishing, and if in the second year there is some improvement, it ought to be continued for 3 or 4 years so as to bring the nervous system completely under its influence. It is an important question whether the system becomes insusceptible to this drug when it is given for a great length of time. My experience leads me to think not, and this opinion is corroborated by Mr. Tyrrell's statement that belladonna may be constantly used for several years together, without any injurious effect, and without losing its influence upon the iris. (*Vide* Vol. II, p. 381.)

Bromide of Potassium acts much more rapidly; but I rather question if its influence is so lasting as that of belladonna. Dr. Bazire states that the system gets habituated to its action when it is taken regularly for a long period, and that then it exerts very little influence, if any, over the fits. When this has happened, it should be omitted for 2 or 3 months, after which it will be found useful again. Dr. Reynolds says it is the one medicine which, as far as he knows, has proved of real service in the treatment of Epilepsy. In some cases it has completely cured the patient, and the cure has been permanent for years and is so now. In Epileptic vertigo, according to Bazire, Bromide of Potassium has failed to do much good. "Individuals suffering from a combination of convulsive fits and attacks of 'petit mal' have got rid of the first after a prolonged use of this medicine, whereas the latter have been scarcely modified," except that their frequency has been reduced. The dose of KBr. varies a good deal, according to individual peculiarity. One person may not bear more than gr. x or gr. xv *ter die;* another will take gr. xl or more *ter die.* The degree of tolerance seems to me to vary a good deal with the degree of hyperæsthesia. In a good many instances I should be disposed to combine the two sedatives, giving the Belladonna in pills and the Bromide in solution, and discontinuing the latter for a longer or shorter time every 2 or 3 months. The sedative influence of KBr. is so very marked that its success in Epilepsy seems to me remarkably to confirm the view generally taken, that hyperexcitability of the encephalic nervous centres constitutes the essential derangement in Epilepsy. It is, in fact, hardly too much to say that this drug is likely to be useful whenever hyperæsthesia betrays itself in any part of the nervous system.

As to Tonics my general experience is that only the milder and least exciting are likely to be beneficial, except in some special cases. Tannin, Zinc, and Silver are those which I prefer. Trousseau employs the same, only substituting copper for tannin, and administering them in what is, I think, a good way, viz. alternating them. Thus, for the first ten days of a month, he gives nitrate of silver gr. $\frac{2}{5}$ *o. n.*, the succeeding ten days gr. j of copper filings, the last ten days lactate of zinc in doses of gr. ij—viij. After this he returns to the nitrate of silver and so on. I am inclined to think we overlook this principle of varying our remedies too much, and I am not all clear that Esquirol's remark, that Epileptics are apt to improve for a time with every new remedy, is to be referred to the effect of novelty on the *imagination*. Mr. Tyrrell has recently ('Med. Times. and Gaz.,' 1867, May 18th, August 24th) lauded very much the utility of Strychnia. He believes that it will always control the excitability of the medulla oblongata, and prevent convulsions, but that to cure the disease we must also remove the exciting cause. Several cases are related in proof of its good effects. In one of severe convulsive Epilepsy the patient had only 11 attacks during the month of July, while taking Strychnia, though in May without treatment he had 51. The idea of employing the remedy was suggested to him by v. d. Kolk's experience of the bad effects of Conia, its opponent. I have occasionally employed Strychnia in Epilepsy, but have not been favorably impressed by its effects, though as a nervine tonic I am quite partial to it. The fact that sedatives such as K Br. are so suitable to most cases of Epilepsy seems to me to go far to show that the morbid condition is apt to be intolerant of tonics, which act as irritants. This objection does not apply to Oleum Morrhuæ, which may often be given with advantage. My experience of its good effects, however, falls short of Dr. Anstie's, who cured 7 out of 20 cases of Epilepsy completely by its means. Digitalis, which I regard as a tonic to vaso-motor nerves, has, says Dr. Sieveking, long and deservedly enjoyed a good reputation in the treatment of Epilepsy. He has been surprised at the tolerance of it manifested by some Epileptics. Rapidity and excitability of the pulse seem to be the chief indications for its administration. As it is certainly very serviceable in some forms of maniacal excitement, I can quite believe it may be so in Epilepsy. Dr. Cox's case shows very well how the state of mental excitement may vary according to the frequency of the pulse. As it was slowed from 90 to 70 a furious condition was exchanged for a rational. What occurred in the hemispheres in this case may occur in the medulla oblongata in others.

A very few words may suffice for Specific remedies, such as Cotyledon umbilicus, Galium album, Mistletoe, Indigo, Artemisia vulgaris. It is quite certain that they fail a great deal oftener than they succeed, and that we have no means of knowing at present to what cases they or any of them are appropriate. Nevertheless, if, as too often happens, rational measures fail, there can be no objection in having recourse to empirical, provided they are harmless. If I believed human bodies to be invariably uniform and alike, I should not expect any good whatever from agents so notoriously uncertain, but knowing as I do the remarkable differences and idiosyncrasies which so often exist I will not discredit altogether the testimony which has been given in their favour.

Dr. Reynolds thinks a further trial should be given to the Mistletoe, and Dr. Copland speaks of it as a medicine of great power.

The *interception of the aura* in cases where it proceeds from a limb has been favorably spoken of by good authorities. Either a ligature may be applied or a circular blister. The latest experience relative to this means is not very favorable. Dr. Buzzard tells us that in one case it arrested the attacks for more than 5 months; no recurrence had taken place when he wrote. In a second it only caused the aura to shift from the left to the right wrist. In a third case the aura had originally affected one hand only, but after the intercepting blister it affected both. The chief fear I should have in resting much on this means would be that a compelled quiescence might be succeeded by an outbreak of such severity as to bring life into great peril. Dr. Brown-Séquard tells us that ligatures act with greater efficacy when they suddenly induce powerful irritation of the nerves of the skin than when they are applied gradually, either tightly or not. He regards these agents as well as pinching, striking, or rubbing the seat of an aura, chiefly as a means of irritation of the nerves of the parts to which they are applied, the irritation producing a favorable change in the nervous centres. This is the same view as I have taken of the action of liniments in relieving pain.

As to Hygiene, besides ordinary rules, the following points seem to me worth mention. First, the advantage in certain cases of a milk and vegetable diet attested by Heberden, Cheyne, and Russell Reynolds. I can well understand that this regimen may very materially lessen abnormal excitability. In all cases we should carefully consider the diathesis of our patient, and regulate his diet accordingly. One would not allow beer or port wine to the gouty.

Secondly, we may learn an instructive lesson from Brown-Séquard's guinea-pigs, whom he rendered epileptic. When shut up in cages, and abundantly fed, they had 40 or 50 fits per day; but when allowed their liberty, and put on a different regimen, the convulsive tendency disappeared in a few weeks.

Thirdly, I borrow from Dr. R. Reynolds the following important hint as to the position of the body during sleep. Raising the head and upper half of the body, not by pillows, but by an inclined plane set at an angle of 45°, and placing a pillow under the sheet below the nates to prevent the patient sliding downwards, are tolerably certain means of reducing greatly the frequency of nocturnal attacks.

As to employment of the mental faculties I have no doubt that their moderate exercise is desirable, and that a medium course should be pursued, if possible, between enforced repose and fatiguing efforts. Whatever engages and interests the mind seems really to increase and develope nerve-power, while nothing is more depressing and deteriorating than monotonous idleness.

LEEDS SCHOOL OF MEDICINE

CHAPTER XVI.

INFANTILE AND PUERPERAL CONVULSIONS.

Infantile and Puerperal convulsions are identical as to phenomena with those of essential Epilepsy. The points which differentiate them are the circumstances under which they occur, and the much greater continuousness of disorder in the one than in the other. The causal conditions are more evident and special in infantile and puerperal eclampsia than in ordinary Epilepsy. The seizures occur all together, so to speak, in rapid succession, and are not separated from one another by intervals of some considerable duration in which the health of the patient is fairly good. There is not nearly the same liability to recurrence of the seizures when they have once fairly ceased, they are much more dependent on some occasional and transitory condition. The puerperal state seldom gives rise to convulsions except in first labours, the liability to such attacks diminishes rapidly as the period of early infancy passes away. Yet, even in the particulars noticed, there is no broad distinction to be made between the two. An unknown predisposition is necessary for the occurrence of fits, both in Epileptics and in the eclamptic child or female; the presence of certain causal conditions does not suffice *per se*. Convulsions are not always multiple in children, nor isolated in adults. Dr. Reynolds relates a case in which 8 or 9 violent seizures occurred in about 2 hours in an Epileptic male. However different the attendant circumstances may be, the result when produced is so identical in both cases that as far as regards treatment, the measures appropriate to the one are also to the other. In the following remarks, therefore, as to the remedies advisable in the severe and rapidly recurring attacks of infantile and puerperal eclampsia I include what I would wish to say relative to the management of similar seizures in ordinary Epileptics.

The first point for observation is, that the morbid process is not of the same quality in all cases, and is not in all to be dealt with in the same way. Depleting and so-called lowering treatment is sometimes most beneficial, I may say essential, as the following history proves.

Case i.—Mary D—, æt. 19, a well-developed, robust, plethoric woman. Has always lived well, and never had a day's illness. Has one sister, æt. 14, who some years ago was subject to occasional Epileptic seizures. On July 25th, 1866, Mr. Draper was called to see this patient in her first labour. Before his arrival she had had 2 fits of convulsions in which she had bitten her tongue, and foamed at the mouth, while her features were much distorted. He found the patient in a "semi"-conscious condition, recovering from the second attack. Her face was flushed, skin hot but moist, tongue large and red, and lacerated by teeth, head hot, pupils rather contracted, pulse 120, full, and with difficulty compressible. Occasional slight muscular spasm. The child's head being at the pelvic outlet, where the midwife said it had been about 2½ hours, the forceps were applied and a fine male child delivered. It was slightly asphyxiated, but was quickly restored. The placenta was expelled in about 20 minutes with only the usual discharge of blood, and the patient appeared quiet and comfortable. In 45 minutes the convulsions returned, the paroxysms being more severe than before. Mr. Draper having secured the tongue from injury, ordered sinapisms to the back of the neck and to the calves, cold to the head, and Calomel gr. v + Jalap gr. xx as soon as she was able to swallow, also the following draught every hour. Antimonii Pot. Tart. gr. ½ + Potass. Nitrat. gr. x + Sodæ Pot. Tart. gr. xx + Mist. Camph. ℥j. Most of the powder was rejected by vomiting. After this the patient remained tolerably quiet about 2 hours, when she had a second relapse, the fits being more violent, and recurring more rapidly than before, and she remained quite unconscious between the paroxysms. The face as before was flushed, respiration hurried and short, pulse 120—130, hard. As there was no albumen of consequence in the urine, about 25 oz. of blood was taken in a full stream from the arm. The pulse then became soft and compressible, and the patient shortly became conscious. She was now ordered Calomel gr. v + Ol Croton ♏j, the antimonial to be continued. After this there was no return of the fits, the patient slept moderately well during the night, and made a good recovery. ('Lancet,' 1866, Nov. 3rd.)

Dr. Dyce ('Brit. Med. Journ.,' 1868, Vol. I, p. 372) speaks positively of the good effects of V.S. carried to a great extent in puerperal convulsions, and places his chief reliance on the free use of the lancet, though not to the exclusion of other very important auxiliary remedies. The free and immediate use of the cold douche with purgatives he deems essential. Opium and chloroform in their proper place he regards useful. Dr. Swayne's experience is very similar.

Side by side with the case just quoted I would put that related by Dr. West of a little girl, æt. 2, in whom an attack of variola came on with severe head symptoms, several convulsive seizures, and complete insensibility, before the appearance of the eruption. She was bled, and had 8 leeches to the head twice, cold affusion and purging. The last bleeding was followed by great diminution of the convulsive movements. She became quiet and sensible after the appearance of the eruption, and passed through the disease favorably. Had she not been bled Dr. West says she would most likely have died from apoplexy, and he thinks it probable that the depletion might have been carried still further with advantage. A case related by Graves ('Clin. Med.,' p. 743) is also so illustrative of this important point that I cannot forbear quoting it. A boy, æt. 9, while convalescing from a severe attack of scarlatina was attacked by anasarca succeeded by convulsions. The latter came on quite suddenly at 6 a.m., and the fits had been so violent, and succeeded each other so rapidly, that at 9 a.m., when Graves saw him, he appeared to be moribund; his eyes were distorted, void of expression, and fixed, face cadaverous, extremities cold, his pulse very feeble, and so rapid (145—150) that it could not be accurately counted. In addition he appeared to be nearly destitute of muscular power, and in the interval between the fits was unable to speak, while a loud tracheal râle seemed to announce the near approach of death. We proceeded, after placing him in the sitting posture, to pour a small stream of cold water on his head, the effect of which was extremely satisfactory; for in a short time the eyes assumed a more natural appearance, and lost the spasmodic fixedness, while the pulse became more and more distinct, and diminished in frequency, he expectorated the mucus which had clogged the larger air-passages, and had caused the rattles, and in the course of half an hour the patient was able to speak and swallow. The convulsions returned several times during the ensuing day, but at each recurrence their duration was lessened, and their violence diminished by the cold affusion. Sitting by the bed of this patient I was able, Graves says, more than once to predict the immediate approach of the fit by watching the pulsation of the carotids, which then became much more frequent and stronger. This observation in connection with the fact that the pulse at the wrist became weaker and more indistinct at that very moment, suggests many interesting considerations concerning local determinations of blood. The record goes on to say that various other active remedies, such as leeching the neck, purgative injections, and mercurials to ptyalism were employed, and that a perfect recovery ensued. Sir Thomas Watson records a very similar instance in which scarlatinal anasarca, attended with headache, convulsions of one side of the body, coma, and hemiplegia, was speedily cured by a full V.S., cupping to the temples, and mercury to profuse salivation. Dr. B. W. Richardson speaks in the strongest terms of the good effects of V.S. in cases of acute uræmic poisoning attended with complete coma, hot skin, and strong convulsions ('Pract.,' Nov., 1868). Dr. West says he has seen some remarkable instances of convulsions arrested, and children roused from coma by cold affusion continued for 5 or 6 minutes. With such cases we must rank, I think, those whether originating in scarlatinal uræmia, or in any other way where compression of carotids is found to be highly beneficial. Trousseau ('Clin. Med.,' Vol. I, p. 130) speaking of convulsions occurring in scarlatinal dropsy, says that he has employed this procedure, and recommended it more than 20 years, and that he, as well as other physicians, has found it eminently useful. He gives the following rules for its performance. When the Epileptiform convulsion predominates on one side, compression is to be made chiefly on the opposite; when the convulsions are equal on both sides compression is to be performed for 15 or 20 minutes on one side, then (for the same time) on the other. The effectual compression of the carotid (the common) is announced by the arrest of pulsation in the corresponding temporal artery, by the pallor which sometimes suddenly succeeds the previous red flush, and in some fortunate instances by the circumstance that no sooner is compression established than the convulsion gives place to the most complete relaxation. One's faith in Trousseau's report is confirmed (if that were necessary) by his making no pretension to invariable success; he simply says that by this method, with the necessary patience, in a certain number of cases the convulsions attendant on scarlatinal anasarca may be arrested. This is only what might be expected, it is not probable that cerebral hyperæmia is in all, perhaps not in the majority of instances the most important factor of convulsions. Some recent observations are strongly confirmatory of Trousseau's statements. Favez relates 3 cases. The first was that of a child, æt. 6 years, who had violent spasms of the left side of the body, with clenched jaws, bitten tongue, and spasmodic movements of the head. Compression of the right carotid stopped the fit immediately; the child fell asleep, and awoke in full consciousness a quarter of an hour after. The second patient was a girl, æt. 7, she suffered convulsions of the right side of the body (apparently induced by fright), here compression of the left carotid produced equally happy results. The third patient was a child, æt. $2\frac{1}{2}$ years, the convulsions affected both sides, compression was applied to the right carotid, and the convulsive movements of the left side ceased at once. The left carotid was then compressed, and the convulsions of the right side ceased. Sleep followed, and in an hour the patient woke up quite well. ('Syd. Soc.,' '65—'66, p. 127.)

The statements which I have cited fully justify those made by Parry more than 80 years ago, and it seems to me difficult to draw any other conclusion from the evidence we possess than that hyperæmia may constitute in some instances the most important element of the condition giving rise to convulsions. Romberg accepts Parry's observations, and states that he has found the proceeding to be an effectual prophylactic if employed in patients who have forewarnings of their attacks, and are able to apply it in time. The effects of compression of the carotids on the hemispheres have been already noticed, and seem to me certainly to prove that a true state of anæmia of the intra-cranial vessels is produced. As the medulla oblongata is chiefly supplied from the vertebral and basilar arteries, it may not be so much affected by the arrest of the current in the carotids, but I think it must participate in the anæmia, because proportionally more blood will pass on through the posterior cerebrals and posterior communicating to fill the emptied branches of the internal carotid.

Such instances as those now adduced represent one side of the picture; but there is surely also another, of the existence of which I must now supply illustrative proof.

In the valuable report in the 'Lancet,' from which I have already taken one case, the following remarks occur. Examples of puerperal convulsions occur from time to time in which, on account of the feeble condition of the patient, bloodletting is contraindicated. In these the convulsions are satisfactorily treated by chloroform, its anæsthetic and sedative action being kept up so long as the disposition to their return shall continue, the bowels at the same time being properly cleared out by an efficient enema, and a calomel purge. Should the patient not have been delivered, the relaxation of resisting tissues which chloroform induces will be a gain in the labour, and render delivery by the forceps, should it become necessary, sooner possible. The following records are then given of two such instances occurring in Dr. Hall Davis's practice. — —, a primipara, about 27, not a plethoric subject, stated that she had, before delivery, much œdema of the ancles, of the hands, and also of the face in the morning. The urine contained a large amount of albumen. The os uteri was about the size of half-a-crown. Many paroxysms had occurred. Chloroform was exhibited and kept up for the necessary period. The convulsions were quickly subdued, the soft parts dilated rapidly, and an early delivery by the forceps of a living child was the result. Another similar case in which blood-letting was contraindicated was that of a lady who had had 4 or 5 children. She was unhealthily fat, and of a highly nervous temperament. The disease came on some days after a natural delivery, and was consequent upon a mental shock. She had severely bitten her tongue before assistance was obtained. The urine contained no albumen. Violent convulsions were recurring at short intervals. Chloroform, given at each threatening of a paroxysm, was resorted to during about 7 hours, the bowels at the same time being freely purged by aperients. With a little necessary care in regard to diet, and due regulation of the bowels for a few days, this patient did well. Dr. Eastlake (Brit. Med. Journ.,' 1868, Dec. 12) records 3 cases of puerperal convulsions, in none of which V.S. was requisite; all recovered. In the first, after two severe attacks, gr. x of calomel and aperients were administered, ice applied to the head, and sinapisms to the legs, nevertheless, convulsions recurred every hour. Six leeches were then applied to each temple. Soon after noon a very prolonged and violent convulsion took place; and between 4 and 5 p.m. two occurred in such rapid succession that scarcely any interval was perceptible. Dr. Greenhalgh then suggested dry cupping at the nape of the neck, and this was followed by the happiest results. The fits ceased entirely, and the patient was soon restored to consciousness. She had in all 13 convulsions. The urine in all 3 cases was albuminous; it was so also in 2 of the other 3 I have cited. Trousseau declares that there is no necessary connection between the albuminuria and the convulsions. Dr. Dyce is of the same opinion.

Another instance in which sedatives were highly beneficial is related by Scanzoni. (*Vide* 'Edin. Med. Journ.,' 1860, May, p. 1045.)

Case 2.—The patient, a primipara, æt. 21, was admitted June 8th at 8 a.m. Labour had commenced in the night, and she had been seized with nervous paroxysms and loss of consciousness. She had no recollection of what had occurred in the night. The whole body, and especially the lower extremities, were œdematous; the tongue was bitten on the right side; the urine was very albuminous, and deposited numerous casts. Very soon after admission a second convulsive attack occurred, which was of a very marked character, and lasted some minutes. On recovering consciousness she could answer questions, though slowly. Six more attacks occurred by 5 p.m; the last was the most violent. After the 4th paroxysm, consciousness did not return, and the breathing became stertorous. At 10 p.m. she was bled to 8 ounces. Tr. Opii ♏ 25 were given in enema, and cold irrigation applied to the head while the body was in a warm bath. After this three subcutaneous injections of the meconate of morphia were made, the quantity injected amounting in all to about 12½ grains of opium. At 7 a.m. next day she was in profound coma. The os uteri was incompletely dilated, but delivery was accomplished by means of the forceps. During the operation there was no paroxysm. At 11 p.m. a seventh attack came on, but was slight and short, after which she became excited and tried to escape; but towards morning she grew calm. At 9 a.m. she could answer questions put in a loud voice. During the whole day she remained like a drunken person. Pulse 128. After this she had several slight attacks of mania, but soon became rational; improvement went on steadily; the urine ceased to be albuminous, and the patient was discharged on 21st. Scanzoni considers the results of the morphia injections to have been most satisfactory.

We will now look at some parallel instances of infantile eclampsia.

Case 3.—B. G—, æt. 2, was having pertussis mildly; but after about 14 days or so from the commencement of the ailment he became worse, got constant hacking cough, and appeared ill on night of June 16th. In the morning, however, he appeared to be doing quite well, and was cheerful. Very soon after he had a severe attack of convulsions, which subsided partially, but had not by any means passed away when I saw him about 2 p.m. He took then one dose of Camphor and Sulphate of Zinc, and, 2 hours later, 3 grains of Bromide of Potassium. Iced rags were constantly applied to the head, which was very hot; the pulse was 160, and the skin was hot. His breathing was easy enough up to about 4 p.m. His right arm then was twitching a good deal. An hour before there was a good deal of râle in both backs, but the air entered pretty well. Between 4 and 5 p.m., on listening to the backs, I heard no entrance of air and no râle; all was silent, and there was considerable dyspnœa. The cold douche to the head, and hot foot-bath, which he had had an hour before, was repeated, and as there was no improvement ʒj doses of Vin. Ipecac. were given. Efforts at cough were now made several times, but he could not expectorate the clogging mucus, and at, or a little after, 5 p.m., suffocation appeared imminent; in fact, I thought once or twice that all was over. He seemed almost, if not quite, unconscious. Cold water was dashed on the face, and, as he could not swallow, drops of sherry were put between his lips. This was continued until he got able to swallow, and then he took the sherry more freely and became half tipsy. About this time he was seen by an eminent physician, who advised the continuance of the Bromide, with the addition of a little Carbonate of Ammonia. When I saw the patient at 8.30 p.m. he was infinitely better; he spoke easily; had no dyspnœa; and the breath sound was heard plainly and without râle in both backs. The bowels acted 8 or 9 times during the day; and on this account I gave 2 drops of Nepenthe with Potass. Bromid. at night. He had a good deal of sleep; and at 9 a.m. of 18th his skin was comparatively cool, his pulse 114; he was quite rational, and took milk freely. The Bromide was continued 4 times a day. From this time he went on quite well. The convulsions in this instance were, I believe, in no wise dependent on hyperæmia, but solely on nervous hyperexcitability. The concurrent diarrhœa suggests that the enfeebled nervous system had been further deranged by a stroke of influenzal catarrh. This may have also occasioned the mucous secretion which, together, probably, with some amount of glottic spasm, so nearly destroyed life. Ipecacuan., which often serves us so well in catarrhal affections, entirely failed here, I fear may have been injurious, and the wine was really the restorative agent. The child was far from robust, and all lowering measures were plainly unsuitable.

Dr. James Jones ('Med. Times and Gaz.,' 1864, March 5th,) advocates the administration of Bromide of Potassium in cases of infantile convulsions, characterised by hyperæsthesia of the nerve-centres, coupled with anæmia and complete absence of all symptoms of inflammation. The child has an aspect of timidity, and an expression of anxiety, talks or mutters in his sleep, often starts up frightened. The urine is pale and copious, the tongue clean, the pulse weak and irregular; the fontanelle, if existing, is always depressed. Depletory measures are injurious; opium is often of great service. Trousseau mentions having been called to see a child, æt. 5, with damaged brain and imperfect intellect, who was seized with frightfully severe convulsions after he had had one short seizure the evening before. When seen his face was so congested that he appeared all but asphyxiated. Chloroform was administered by inhalation from 6—12 p.m., and by means of this medication the child, who was *in extremis*, was restored to life, and recovered his usual health. ('Clin. Med.,' II., p. 137.) In a case I shall subsequently relate, where laryngismus stridulus was aggravated into well-marked convulsions, chloroform inhalation and full doses of morphia were evidently useful, and all depletion was out of the question. Romberg (Vol. II, p. 192) mentions that the fits occasionally run a regular periodic course, and assume the quotidian (rarely the tertian) type. A boy æt. 5, whose mother had suffered from eclampsia during pregnancy, had for 8 days previously been subject to attacks of eclampsia, which recurred daily between 4 and 5 a.m., and were preceded by headache. As there was a large accumulation of ascarides, purgatives of calomel + jalap were ordered, the effect of which was that no regular paroxysm occurred for 6 days, but that every day at the same time headache and giddiness, and an occasional distortion of the right ala nasi and angle of the mouth supervened. A fortnight after he was first seen, the paroxysms having returned at the same time, Quinæ Sulph. gr. i *quater die* was ordered; upon this they gradually abated, at last passed into a slight rigor, and in about 3 weeks ceased altogether. The disease ran a similar course in a boy æt. 12, who, when first seen, had been attacked with eclampsia every evening for 8 successive days; the fit was preceded by vertigo, and no appreciable cause could be shown to exist. With quinine 5 grains daily the convulsions gradually disappeared, and in their place there was merely headache, vertigo, and sickness. After 8 days of treatment he was quite recovered. Such instances as these remind us forcibly of Epilepsy of malarious origin, and it is most evident that they cannot be ranked for a moment with those where depletion is requisite. Such a remark may seem utterly commonplace, yet it cannot be thought uncalled for when we find so great a practitioner as Trousseau affirming generally that the less we do in the treatment of children's eclampsia the better, and that "avant toutes choses il faut se garder de ces moyens perturbateurs, saignées, sangsues, pretendus révulsifs cutanés, toujours dangereux, presque jamais utiles." Antispasmodics, ether, musk, belladonna, he allows to have some efficacy, as well as compression of the carotid and chloroform inhalation. Romberg is, I think, more judicious in admitting that in children who have previously been healthy, robust, and plethoric, during the period of dentition, or in the course of acute exanthema, it is proper to abstract blood, locally in young children, by V.S. in elder. Emetics, purgatives, and especially the cold affusion, are remedies whose use he advocates; but in atrophic and anæmic children he sees that excitant means are preferable. One of the ablest of recent writers on the subject of convulsions thinks that the mass of evidence goes to show that spasm is a sign of enfeeblement of nervous matter, and rejects bleeding altogether (except to relieve dyspnœa) and the cold affusion. In puerperal eclampsia Trousseau is also adverse to any general or local bleeding; and no doubt there are those among ourselves who would agree with him.

To conclude this matter, I would shortly say that while in a more or less unhealthy urban population the cases where depressing treatment of any kind is requisite may be rare, I hold it contrary to experience and unsafe to conclude generally that such do not occur under more favorable hygienic conditions, and I think we ought to hold ourselves in readiness to act in each instance according to the existing circumstances.

Puerperal eclampsia, as we have seen, is not necessarily attended with albuminuria, and cannot, therefore, be always dependent upon it. Nor does there seem sufficient reason to attribute it to uræmia, or any other toxic condition, for it is not shown, as far as I know, that the urine even if albuminous is of low sp. gr., and deficient in urinary solids, and the patients are sometimes apparently in perfect health up to the time of the first seizure. This sudden occurrence in the midst of good health is very much what we often meet with in Epilepsy. There seems to be no tendency in the disorder to return in the absence of pregnancy, and it is certain that it may ensue some months before as well as some short time after the actual labour, so that it cannot be referred to any peculiar excitement of the system occasioned by the uterine throes. We can only regard it as a peculiar neurosis essentially similar to those manifold others which are apt to befal the pregnant female. Just as chorea, insanity, mental torpor, gastric irritability, hemiplegia, &c., may be produced by the gravid state of the uterus, so may the tendency to eclampsia. This is only another illustration of the connection subsisting between these various nerve disorders. A story cited by Dr. Churchill is quite in accordance with this view. "The wife of a citizen of Ferrara, æt. 20, of a bilious constitution, and mother of 3 children, was attacked with periodical Epilepsy whenever she conceived, and sustained a paroxysm of that malady once a fortnight during the whole of her gestation; but as soon as she was delivered the disease left her. Its occurrence, therefore, was always a sign to her that she had become pregnant."

Infantile eclampsia is also evidently *au fond* dependent upon an hyper-excitability of the nervous centres peculiar to that time of life, and which diminishes rapidly as the years of childhood pass away. It cannot, therefore, be looked upon as identical with the tendency to Epilepsy, which is more specially an appanage of the years of youth and early manhood, and is increasing at the time when the former has disappeared. But both tendencies have evidently much in common, their promoting causes, their results, their perils, their remedies are almost identical, and I think it would be a greater error to sunder them widely than to class them together. On the relation subsisting between children's convulsions and the Epilepsy of adults the remarks made by Dr. Hughlings Jackson are so important that I cannot forbear quoting them. He says ('Syst. of Med.,' Vol. II, p. 232): "I cannot think for my part that overeating, the irritation of worms, &c., or any such local disturbances, are likely to bring on a fit in a child whose nervous system is really healthy. And when we find, after getting rid of such causes, that the fits cease, and the child gets into apparent good health, we should, I submit, bear in mind that a feeble, or we may call it an excitable nervous, system has to be reared, and may again fail when it is next tried, although in a very different way. . . . . One thing is perfectly certain, that Epileptic fits in adults not rarely date from convulsions in infancy. The connection is shown now and then by straggling fits at intervals of months or years, or by uninterrupted continuity of attacks at fairly regular periods. I have no facts, and I know of none on record, to show how many infants keep well after getting through severe convulsions, but of this I am certain, that attacks in infancy, from one which attracted little attention, thought to be 'only the teeth,' to a whole batch, are followed by Epileptic fits near the age of 7, 14, or 20." The influence of hereditary constitution is very marked; in some families (as Romberg says) almost all children are attacked with eclampsia. This feature assimilates the two, I might say the twin, maladies. Remote irritation plays a much more important part in infantile eclampsia than it appears to do in Epilepsy. Adults may load their "primæ viæ" with indigestibles, or suffer severe irritation there or elsewhere, yet Epileptiform attacks rarely result. But it is otherwise with children, especially infants, who are apt to be marvellously capricious as to what suits their interior lining. What agrees perfectly with one disorders another grievously. Zimmerman relates an instance of a child who during the first months of its life had frequent attacks of violent convulsions, which disappeared entirely upon the prohibition of meal pap. (Underwood.)

The last-mentioned author says that convulsions are occasioned much oftener than is suspected by over-feeding. Some of the finest and largest infants he had ever seen died suddenly within the month, "immediately after the nurse had boasted of their having eaten *three boats full of victuals.*" Andral gives the case of a nurse who suckled her own child without any mishap ensuing, but when she tried to do the same for two others, both were attacked with convulsions. Pins and needles getting out of place are apt to do serious mischief, they have been found sticking in the brain, the liver, or the fontanelle of children, in whom they had evidently caused convulsions. Ill-arranged clothes may do harm in a like way.

In the following case the cause of derangement is sufficiently apparent:

E. C—, female, æt. 7, admitted May 17th, 1869. Has not been well for some weeks; her mother says she has not been the same child since she had smallpox a year ago. Was taken ill yesterday with severe fits attributed to fatigue; she walked a good long way, and had a meat dinner after. Was brought in this morning severely convulsed, the attacks continued for 2 hours after her admission. There was a peculiar offensive smell proceeding from her body, though she was quite clean. At first she appeared to be dying, the ward sister thought she could hardly live, the left leg was paralysed and very cold, there were dark circles under the eyes; the child looked like one in cholera. During the convulsions the face was repeatedly twitching, and drawn to the left, the left limbs agitated, the right not moved. She ground her teeth, was quite unconscious, her surface was livid, and she was speechless. The bowels were moved by an injection, the neck blistered, turpentine stupes applied to the trunk, and a dose of Calomel given. The convulsions were abated after the bowels operated and the turpentine stupes had been applied. The stools procured were most offensive, dark, and lumpy. When I saw her, about 2 p.m., she was lying in bed, rolling about, especially towards the left side, the left limbs were still, the right agitated so much as to make it necessary to confine them; she was scarcely at all conscious, her head rather hot, the pupils rather large, equal; she was constantly crying out in a kind of delirium. Pulse weak and quick. Temperature 101·12. Heart's sounds normal. A tepid bath was ordered, and Potas. Bromidi gr. vij + Liq. Morph. Bimec. ♏ij + Tr. Hyoscy. ♏v + aq. ℥ss 4*tis horis.* 18th.—Pulse 138, sharp; has slept a great deal, is more conscious. Left arm evidently paralysed, and left leg does not move readily. Bowels well open, motions palish. Bladder irritable. Urine pale, not albuminous. Takes nourishment pretty well. To continue the Brandy which was ordered on admission; she has 3 oz. a day, the first day she took 4 oz. in 12 hours. Temperature on 19th, 99·1°. Pulse 102, very weak. 22nd.—Tr. Cinchon. flav. ♏xv *ter die.* Broth diet. 24th.—Has regained in great measure the use of left arm. June 4th.—Discharged quite well. The cause of the convulsions was, no doubt, the state of the bowels. The morbid impressions generated here told injuriously on the pons varolii and medulla, on the hemispheres, and right corpus striatum, and on the centres regulating the temperature. The paralysis was very nearly complete, especially in the arm; it was evidently of the same nature as occurs in cases of Epilepsy.

Glancing now at Treatment, we cannot but notice further resemblances between Epilepsy and eclampsia. The one medicine which a high authority says has proved of real service in the former is also of recognised value in the latter. The general principles of management are altogether the same.

Most of the remedies advisable have already been mentioned, but there are one or two which call for some further notice. Musk does not seem to be much in vogue at the present day, but Trousseau advises its use, and Underwood recommends it highly. He states that "in some of the worst cases of long-continued convulsions and fits apparently truly epileptic, not to be attributed to the usual causes of infantile irritation, as well as where all the customary remedies have been previously and unsuccessfully tried, a free exhibition of musk has restored children to health. And this not only where the long continuance of the fits has led good physicians to pronounce them idiopathic; but where the convulsions have also induced total blindness, or otherwise deranged the faculties for several months. At least I may assert that an immediate abatement of the fits has followed the exhibition of this medicine, and in the end the removal of all ill consequences."

The advantage of removal to a purer air in certain instances, and the possible ill effects of an atmosphere charged with noxious emanations, is strongly evidenced by the following history which I take from the same source. An infant was seized with fits when scarcely 14 days old, and continued to suffer, but with increased severity, in spite of regulated feeding and all sorts of medication, until it was 8 weeks old, when it was very emaciated, and the attacks were almost constant. It left town in the evening, and had many fits the ensuing night, but the next day had only two, and subsequently none, no medicine being given. Underwood justly attributes the speedy and entire recovery to change of air, because the infant was removed from a liquor-house, the lower part of which had always a very strong and disagreeable smell of ardent spirits. The sequel tends much to confirm this opinion, for after the child's health was fully restored, and it was thriving well, it was suddenly seized with a kind of spasm on the chest, and died in 2 or 3 seconds in the bar-room of the liquor-shop in which its parents resided. It is remarkable, however, that the mother had borne other children in the same house, none of whom had any kind of fit. Another similar instance is related by Dr. Marsh in which reiterated attacks of spasm of the glottis were induced by reiterated exposure to the atmosphere of a room newly painted.

CHAPTER XVII.

CHOREA.

CHOREA must ever be a disorder of great interest to the student of nervous affections, not only from its remarkable phenomena and occasional intensity, but from its relations to other neuroses, the exemplification it affords of important laws in neuro-pathology, and the bearing which a due appreciation of its treatment has upon that of other diseases.

Passing over any detailed description of its well-known phenomena, we will comment first on the fact that the disorder is sometimes one-sided, constituting what is called hemi-chorea. This, in a moderate degree, is not rare; in fact, it is much the same as in Epilepsy, where the convulsions more especially affect one side. It is, however, rather the exception than the rule. Trousseau says that it usually begins on one side and gradually extends to the other, and that it is only in very rare instances that it remains confined to one side. Romberg and Watson give nearly the same testimony. When it is one-sided it is certainly probable that some of the nerve-centres of the encephalon, more or fewer, lying above the decussation are the seat of the morbid action; and this view is supported by the circumstance mentioned by Sir T. Watson, that he has known the disorder in several instances to be attended by pain of the head on that side only which was opposite to the agitated limbs, and to be speedily cured by local detraction of blood from the painful part.

The *precursory phenomena* deserve some notice. They are enumerated by Trousseau as change of character, incapacity of fixed attention and of exertion, failure of memory, caprice, timidity, loss of playfulness, tearfulness, headache, malaise, indigestion, pains in the limbs. Levick notices insomnia as another premonitory symptom. The significance of these departures from the normal condition seems to me very great, especially as they are, so to speak, homogeneous with the symptoms of the fully developed disorder, and may be regarded rather as their beginnings than as separate phenomena. They all imply failure of nerve power.

A remarkable feature of the malady is that the motor power is for the most part notably enfeebled in the affected parts, sometimes to the extent of producing as positive paralysis as exists in hemiplegia from demonstrable lesion. Dr. Todd mentions in his lectures the case of a boy æt. 9, who was brought to him with well-marked signs of left side hemiplegia. He dragged the leg, and had but very feeble power of the arm; the muscles were quite lax, the face was slightly paralysed. He had recently had chorea, which still existed in a slight degree. With iron, shower-baths, and exercise of the limbs, he was almost well in 8 days, and recovered perfectly. A girl, æt. 5, under my care, was so powerless at the commencement of her convalescence from chorea, that she was utterly unable to stand, and her head fell from side to side unsupported by the muscles of the neck. This paralysis is, so to speak, a part of the convulsion, and is, as Trousseau states, most marked in the parts where the latter most prevails, a correlation of morbid actions which is very instructive. It happens in some rare instances that the paralytic precedes the convulsive disorder. Trousseau relates the case of a young female, æt. 18, who was brought to Paris by her mother on account, as it was stated, of paralysis of all the right side of the body. There was not only notable impairment of the muscular force, but also perceptible diminution of cutaneous sensibility on the same side. At this time there was also continual agitation of the hand, and to and fro movements of the foot. These had probably very recently appeared, as the mother had not noticed them. The sequel fully justified the diagnosis of chorea. More or less anæsthesia, or other disorder of sensation, is stated, by the same authority, to occur almost constantly in chorea. Pricking and pinching are borne without eliciting any complaint. Dr. Ogle mentions two cases in which positive anæsthesia existed; in one the sensibility of the affected limbs was diminished, in the other that of the skin generally was much impaired. The special senses are rarely affected; M. Sée, however, seems to have met with an instance of retinal paralysis. In a patient under my care, also, the memory had failed very much. The same occurred in a case of Dr. Ogle's; and in this the connection between the two functional disorders was very apparent. The boy had two or three attacks of chorea, with long intervals previously, and his mother asserted that on each occasion he has, during the attacks, forgotten all his learning, so that he had actually to be taught his alphabet afresh after each attack.

Trousseau states that, with rare exceptions, all choreic patients experience more or less marked impairment of the intellectual faculties. Lads who stood high in their classes fall to the bottom. Marcè adopts the following conclusions with respect to the state of the mental faculties in chorea: (1) The moral and intellectual functions are very commonly affected in choreic patients, at least two thirds show some affection of this kind. The immunity enjoyed by the remaining third cannot be explained either by the age or by the sex of the subjects, by the acuteness or chronicity of the disorder, nor by the extent or intensity of the convulsions. (2) Four morbid elements, which are sometimes isolated, but most frequently associated, should be studied together in the mental condition of chorea patients, viz., (*a*) Derangements of the moral sensibility, consisting in a notable change of character, which becomes irritable and capricious, and may be unusually animated, but is more frequently depressed; (*b*) derangements of intellect, characterised by a loss of memory, by too great a flow of ideas, and by the impossibility of fixing the attention; (*c*) hallucinations which occur in the state intermediate between sleeping and waking, commonly limited to the sense of sight; (*d*) maniacal delirium complicating the chorea from its commencement; this frequently terminates in death, or, if recovery takes place, intellectual disturbance remains. ('Brit. and For. Med. Chir. Rev.,' 1859, July). Sir Thomas Watson states that "when the disease is strongly marked, or lasts long, there is usually some imbecility of mind manifested; a slight degree of fatuity, and a foolish expression of the features. But this goes off with the other symptoms." In one of my patients, a girl, æt. 6, the mental disorder appeared as extreme emotional excitability. While I was sitting by her she was quite tranquil and cheerful, but when her mother came in and brought her a box of toys she fell into a paroxysm of agitation and passionate crying—the very reverse of what one would have expected. With this there existed a state of torpor or inertia of the intellectual as well as of the motor centres; she remained unnaturally still, quasi-paralytic, appeared unable to stand, and passed most of her evacuations under her. Under tonic treatment she became lively and active.

Case 1.—M. W—, æt. 8½, female. She has been ailing with nerve disorder ten to eleven months, has improved much on tonic treatment, but has relapsed last fourteen days. She has been at school, and has been over-exerting herself a little. She is silly, irritable, and bad-tempered in mornings, and then her right arm gets affected with shaking, and her right leg aches, and the foot is everted, so that she cannot walk. At the same time her speech fails, and she stutters. At times she gets quite unconscious, the other day she was so for some hours; she then is pale, and makes a snoring noise in breathing (paralysis of the velum palati). The unconsciousness is apt to come on when she is tired. Has pain in back at times, but there is no tenderness in the spine on percussion. No anæmia. In this case the general condition was allied to chorea, but there was disorder of the intellectual centres as well as of the motor.

M. Thore ('Ann. Med. Psych.,' 1865) has recorded two remarkable cases. The subject of the first was a young lady, who had an attack of acute rheumatism, with pleurisy and endocarditis. Coincidently with the subsidence of the pains, about the 24th day from the commencement of the disease, she began to be affected with choreic movements, chiefly of the left arm and of the face. Two days later, alarming hallucinations of sight, hearing, and feeling occurred; for 2 or 3 days these were very distressing. The mental symptoms and the chorea diminished simultaneously, but the patient remained abstracted and timid for some days. In rather less than 4 weeks from the beginning of the chorea the patient was quite well. The other case was that of a needlewoman, who, ever since an attack of typhus when 11 years old, had been melancholy and depressed. Though she was chlorotic, the catamenia came on at the age of 16, and were regular until the flow was arrested by cold a year later. After the lapse of 3 weeks choreic movements attacked the lower extremities, and subsequently the upper; they were especially strong on the left side. The chorea and the general agitation increased during the next 6 weeks, when, at the height of the disorder, visual and auditory hallucinations of a gloomy kind appeared, especially in the evening. There was difficulty of speech, incoherence of ideas, and melancholy, with a tendency to suicide, and constant thoughts about it. In the course of another six weeks the chorea, the agitation, the thoughts of suicide, and also the hallucinations, began to leave the patient. Simultaneously with the restoration of the catamenia, the cure was complete. M. Thore does not think that the mental disorders occasionally met with in chorea can depend, to any great extent, upon it. He thinks that simple chorea is rarely so complicated, and that mental affections are, for the most part, caused by coincident diseases as rheumatism, typhus, or chlorosis. That the chorea simply considered as an idiopathic disorder of the nervo-muscular apparatus can be a cause of mental derangement is not very probable, but it seems to me scarcely doubtful that the cause of the motor affection is the cause also of the sensory, and intellectual, and emotional pathemata. This seems probable *a priori*, no sufficient reason can be assigned why the cause should always confine its operation to the motor centres alone, leaving adjacent ones untouched. Moreover, experience shows that the same cause does very commonly give rise to disorders seated in very different parts. How various are the phenomena to which pregnancy, malaria, or tænia give rise. A case which was lately in St. Mary's illustrates this point pretty well. A girl, æt. 16, had at first slight rheumatism, which lasted about 7 weeks. Her temperature was not elevated. She then became quasi-hysterical, had causeless bursts of crying, and delusions, fancying that strange persons were present when such was not the case, or that she was at sea. Her memory and intelligence were defective; if sent to open a door she would walk there and stand holding the handle, forgetting to return. Very shortly choreic twitching of the mouth while speaking appeared, and in about 14 days severe general chorea was established, which continued from 3 to 4 weeks, and appeared to yield to purgation, sedatives and tonics having had no good effect. While the chorea lasted, the brain seemed dulled and imbecile; she passed all her evacuations in bed. The catemenia, which had been absent for 3 months, after having been regular for 9, reappeared when the chorea was developed. After this time, however, the delusions ceased, or, at any rate, were no longer remarkable. About a month after the cessation of the chorea, giddiness came on for a few days, and was succeeded by an attack of Torticollis, which yielded to Potass. Iodid. + Ammon. Carb., with one subcutaneous injection of Atropia, and which I interpreted as another manifestation of rheumatism. Here we have a series of morbid phenomena, all referable to the operation of the same cause, the unknown factor of rheumatism, but varying much in outward seeming, according to the locality affected. We may enumerate them as (1) Migratory apyretic articular pain, and slight swelling; (2) delusions and quasi-hysteria; (3) choreic jactitation and cerebral torpor; (4) rheumatic torticollis. I cannot think that any other view than this will fit the facts of the case. My own experience leads me to think with Sir T. Watson and Trousseau, that some degree of mental or emotional disorder is by no means rare in chorea, and this without having made any special inquiry to ascertain the existence of minor grades of derangement, which might easily pass unperceived in young children. Out of 16 cases of chorea before me there are 5 in which mention is made of such occurrences.

The following is a good instance of quasi-maniacal chorea with more violent symptoms than occurred in M. Thore's cases :

Case 2.—E. F—, æt. 19, housemaid, admitted April 24th with acute chorea, accompanied by partial loss of consciousness. The illness commenced gradually 3 months before. Catamenia regular; bowels costive; no mention made of the heart. The disorder is stated to have been hastened and made seriously worse by emotional causes. It was early accompanied by such disturbance of the mind as to lead to the belief that the original choreic disease was associated with hysterical mania or with actual organic disease of the brain or its membranes, as shown by the violence of the movements, the screaming, biting, delirium, &c., necessitating for 3 days the use of the camisole. In the whole course of our experience we do not remember to have seen such a remarkably violent case; it strongly simulated an attack of acute mania accompanied with great bodily exertion, which bathed the patient in a most profuse sweat. The peculiar kind of screaming seemed to be the result of choreic spasm of the muscles of the larynx (of the expiratory of the chest?—C. H. J.) which forced the sounds as it were from the patient. The disease was preceded by low spirits for 6 months. It began in the left side; at first she found she could not pronounce her words as distinctly as before, and every now and then she dropped a syllable. The rather sudden change from violence to a quiet state, accompanied by a dry, typhoid tongue, weak pulse, and muscular exhaustion, was followed by a speedy recovery under the use of ammonia, quinine, beer, wine, and meat diet. Previous to the exhibition of these the treatment consisted of free purgation and the administration of arsenic. The patient's stay in the hospital was only 3 weeks.

Here the hemispheres and the motor centres seem to have been in the same condition at the same time. In the following the mental disorder succeeded the chorea, and was rather comparable to choreic paralysis than to jactitation.

Case 3.—A. F—, æt. 16, admitted November 24th. She never had rheumatism; was a healthy girl before this illness. Catamenia had not appeared, but there had been some molimina. Three weeks before admission chorea commenced, and 2 weeks later had become severe. On admission she was perfectly sensible; had no cardiac disease. After Nov. 30th she convalesced, but her convalescence was marked by a singular mental condition. On Dec. 2nd she answered incoherently when spoken to. When seen there was little remaining spasm, but the face was fatuous and unintelligent. She preferred to sit quiet staring vacantly and in silence; she seldom answered questions, but if she did it was irrationally; she showed great repugnance to the shower-bath which she had had. On Dec. 17th there were indications of a relapse of chorea which was completely checked by a single shower-bath and dose of morphia. From Dec. 21st she recovered steadily and completely from both the chorea and the mental disorder. The tendency to a recurrence of the chorea shows that the disorder though declining was not extinct, and makes it probable that the dementia was really a displaced chorea.

The general inference from all the above seems to me that chorea is a disease the essence of which is impairment of nervous power, and that this impairment may manifest itself in many different ways according to the nerve-centres especially affected. One reason at least why the malady is so frequent in young children is the greater mobility or excitability of the motor department of the nervous system in them than in older persons. What would be a neuralgia in the latter or some other form of sensory disturbance, or perhaps emotional, takes that of muscular jactitation in them. The same difference of innervation is probably the cause of the much greater frequency of chorea in the female sex.

Our next topic is the *causation* of chorea. It is often difficult in this as in other instances to affirm which is the truly efficient cause, the predisposing or the exciting. A fright is very frequently assigned as the starting point of the malady, but it may be questioned in many instances whether this had the chief morbid efficacy, or whether bad air, bad food, and other debilitating conditions among the poor, or a luxurious, effeminating culture among the wealthy, were not the real generators of the nervous derangement. Increasing experience leads me to attribute a very main part in the originating, location, and shaping of disease to the previous conditions which dispose the general system and the particular part to suffer from the subsequent morbific influence. The former are usually the more essential, the latter may vary greatly both in kind and degree. When the former are very potent any, even a slight exciting, cause will as it were explode the mine. When the reverse is the case the exciting causes must be much stronger, and may often fail to take effect. Though I am rather digressing I cannot help observing how these views of the superior efficacy of the so-called predisposing causes go to establish the retributive character of very many disorders which are often imagined to be accidental. We go on a long time infringing some law of our being, unknowing the while that every act of disobedience has added to the cumulating force of those deranged vital qualities which one day some slight cause will call into terrible activity. The transgression is straightway followed by the dark shadow of its punishment. Chorea is quite an instance in point, the permitted indulgence in enervating habits, the neglect to ensure a robust, vigorous frame slowly generates the feebleness and mobility of the nervous system which is of the essence of the disease. This by way of warning to those whose circumstances permit them to avoid such errors, but too often the same result ensues by sad necessity, as is especially seen when the tendency to chorea and its congeners is transmitted by *hereditary* descent. Of this cause Trousseau says it is "incontestable." He recognises the influence of parental morbid states not only when they consist of neuroses but of other diatheses, especially the tubercular. Quite lately two cases have occurred to me which confirm this view. A man, æt. 49, without marked chest affection, except some emphysema, but suffering severely with sciatica, has always been weakly and suffered repeatedly, even to the age of 37, with chorea; his family is phthisical. The other has attacks of epileptic character succeeded by persistent tremor. Nine brothers and sisters have died phthisical besides his parents. He himself seems as yet exempt. Among the Jews, according to information furnished by Dr. Day to Dr. Ogle, chorea seems to prevail extensively and to be often hereditary. Only 2 of Dr. Ogle's 80 cases furnished evidence of transmission. In one of my cases the patient's mother had very frequent and severe epileptic fits in all her pregnancies, and several of her children had fits while teething; in one the attack continued until the age of 16.

Sometimes the malady becomes contagious we may say in virtue of an *imitative tendency*. Bricheteau observed in one of Monneret's wards an epidemic of chorea. In the course of 5 days after the admission of a young girl suffering from most intense chorea, 8 patients already present in the ward contracted the disorder, and in all probability the contagion would have spread more widely had not its influence been arrested by isolation of the patients ('Gaz. des Hopit.,' 46, 1863).

Though I have expressed the opinion that the influence of fright may sometimes be unduly estimated, yet it is unquestionable that both it and other powerful mental emotions are very efficient causes of chorea. Trousseau relates two instances in which the malady came on immediately after; in the first the influence of terror was especially decisive, as the girl presented no trace of rheumatism past or present, and had always been previously in good health. Dr. Ogle mentions two cases, one fatal, in which chorea was induced by the cause in question. Dr. West believes terror to be by no means an infrequent exciting cause of epileptic seizures as well as of chorea in childhood. The potency of this cause will of course be very much in proportion to its severity, but in young children I suppose we must admit that objects which we should hardly suspect may cause great alarm. A case is on record ('B. M. J.,' 1865, Sept. 30th) in which the verdict of a coroner's inquest on a girl, æt. 4, held by Mr. Humphreys, was that "the deceased child died of the mortal effects of shock from fright at the appearance of a minister in a surplice while churching the mother." Whether the clergy as ghostly (geistliche) personages are more alarming than others I do not know, but the mother of one of my patients seemed to assign as the cause of her child's chorea, that he had been woke out of his sleep by a clergyman!

Various other conditions directly affecting the nerve-centres may give rise to the malady. Among these I am much inclined to think that malaria and influenzal miasm may be reckoned, though I do not know of any facts to prove this. Heat-stroke, however, may act in this way, as the following record shows:

CASE 4.—T. A—, æt. 25, admitted June 9th, van driver, never had a day's illness before; ill 14 days. Can assign no cause for his attack except that he had been much exposed to a hot sun all day long. Habits temperate. Began to ail with deranged intellect and manner, and impairment of speech and motor power; puts out his tongue with quasi-choreic effort; is evidently excited and hyperæsthetic; has paroxysms of crying; sleeps tolerably well. He remained under observation till Sept. 19th; his chief symptoms were giddiness, choreic affection, and impairment of speech. He complained that he could not talk freely; if he wanted to talk fast his tongue stopped. Nitrate of silver, with belladonna and country air, were more beneficial than anything else.

The next group of causes are those of a toxic character. Syphilis, rheumatism, insufficient intestinal excretion, and perhaps acute amenorrhœa come under this head. Of syphilitic chorea I know nothing personally, but M. Zambaco quotes two cases of chorea depending apparently upon constitutional affection, and ceasing under the employment of specific remedies. Insufficient intestinal excretion is certainly a very efficient cause, but its existence is far from being easily determined except by the testing action of remedies. The state of the tongue and of the evacuations are not, I believe, sure guides. Rheumatism is at present in much repute as a cause of chorea, and some observers seem inclined to the view that embolism connected with rheumatic endocarditis is the most frequent causal condition. We will first take the older doctrine expressed by Trousseau in these terms, that "of all predisposing pathological causes that whose action is most marked and unquestionable is the *vice rheumatismal.*" He estimates the proportion of cases in which rheumatism is followed by chorea as one third of the whole, reckoning as evidence of rheumatism any traces of bypast endocarditis, as well as the usual articular disorders. My own experience does not lead me to rate the potency of rheumatism as a cause of chorea so highly. In the first edition of this work I stated that out of 15 cases I only found one in which there was any valvular cardiac affection, and this patient was reported never to have had rheumatism or anything like it. In 29 subsequently observed cases there are 4 in which there existed evidence of rheumatism or endocarditis, 11 in which it seemed certain or nearly so that no such disorder had occurred, and 5 in which the negative evidence was less complete. On the other hand, considering the extreme frequency of rheumatism in adults who have it is well known no exemption from chorea, though they are comparatively rarely affected, I cannot but think that the efficiency of this cause is overrated. At the same time I quite accept it as a 'vera causa,' and one of the cases I have related illustrates this very well. Dr. Ogle states that among 80 cases rheumatic fever had existed in 8. Dr. Chambers found that out of 33 cases of chorea, in 6 the affection either began during rheumatic fever or followed immediately after it, or else rheumatic fever succeeded to the chorea. Neither Romberg, Levick, nor Sir T. Watson speak of rheumatism as being at all a common occurrence in chorea. Dr. Peacock, however, met with cardiac or articular affection in 5 cases out of 14. The ratio in which the concurrence is observed varies therefore from about 1 in 3 to 1 in 10, but no observer as far as I am aware has ever noticed that rheumatism could be traced in the majority of the cases. In some it is of course probable enough that the concurrence was merely casual, and that there was no correlation. The proportion may certainly be increased if various prodromata of pains and aches felt in different parts are interpreted as signs of rheumatism. These, however, I feel confident are for the most part mere pains of debility, and have no more to do with rheumatism than the intellectual precursory phenomena which we have noticed. The occurrence of an endocardial murmur, even an apicial one, unless it be situated outside the vertical line of the nipple, or be permanent, has but little value as an evidence of rheumatism or of organic alteration. Even in actual rheumatic fever murmurs are not unfrequently heard in the vicinity of the left apex, which, as Flint observes, afford no sufficient evidence of endocarditis. Thus much, then, for the original view of the relation of chorea and rheumatism, which, when not overstrained, is undoubtedly correct.

I proceed next to consider the more recent, which makes chorea essentially dependent on endocarditis producing derangements of the circulation. Dr. Kirkes believed that whenever chorea occurred in connection with acute rheumatism, the valves of the left side of the heart were inflamed, and that therefore the association was not between chorea and rheumatism as usually believed, but between chorea and valvular disease of the heart excited by rheumatism. He affirmed also that cases of chorea not unfrequently occurred in which no other attendant morbid condition could be found than that of valvular disease. Sometimes such cases happen in individuals belonging to a rheumatic family, and in whom therefore the rheumatic diathesis may be assumed to be in some degree operative; sometimes they happen in association with some of the trivial temporary disorders, as worms and the like. Very often in such cases no evidence of rheumatic tendency can be detected to account for the cardiac disease, nor any proof of the existence of any other ailment likely to explain the chorea. Even in puerperal chorea there may be fibrinous vegetations on the aortic and mitral valves, as in two instances which he details. Of the three possible cases, (*a*) that the chorea produces the valvular disease, (*b*) the reverse, (*c*) that both are the result of some common cause, he prefers the second, though he admits that the third may apply to a certain number of cases. He considers that the irritation leading to the development of the choreic or other analogous phenomena may be accounted for partly by the mere circulation of morbid blood through the nervous centres, partly also by temporary obstruction of the minute capillaries occasioned by fibrinous particles arrested therein ('Med. Times and Gaz.,' June 20th, 27th, 1863). These views of Dr. Kirkes are regarded with much favour by some good authorities, but I cannot give my assent to them for the following reasons. The number of instances of chorea in which we have grounds for believing that endocarditis exists are according to general testimony comparatively small. If, indeed, we found the experience of the London Hospital in 1864 to be at all ordinary—viz., that out of 24 cases of chorea, 20 had a systolic bruit at the apex of the heart persistent in all but 2—Dr. Kirkes' theory would have a valid base, but at present the support afforded to it by facts seems to be but slight. Again, as Dr. Chambers observes, "considering how very common inflammation of the central organ of circulation is in rheumatic children, and that it is at this age that chorea usually occurs, on the mere doctrine of chances they (*i.e.*, chorea and heart disease) would often coincide." Again, we cannot but remember how common it is for patients to have endocarditis without anything at all like chorea ensuing; nor can we leave out of count that when embolism of the cerebral arteries does occur according to Panum, the symptoms are not at all those of chorea, but of apoplexy. Dr. Ogle also says, "I cannot call to mind a single instance of acknowledged capillary embolism attended by phenomena which could even suggest chorea." Moreover, the brain in fatal cases ought to present some evident appearances of arterial obstruction and its results, whereas in one of my own cases there was no trace of any such alteration, although there were evident vegetations on the mitral valve.

In none of Dr. Ogle's 16 fatal cases do I find in the autopsies any mention made of such lesions as attend upon embolism except in the 15th, where the central parts of the brain were much softened. In the only case where the carotid artery (as high as the ophthalmic branch) is said to have been obstructed, the chorea, which was unilateral, was on the same side as the obstruction. Of Dr. Hughes's 14 cases the brain was quite healthy in 4, and only congested in 3 cases; while in the remaining 7 the alterations chiefly consisted of general or localised softening, serous or hæmorrhagic effusion. It seems to me that the state of the brain in fatal chorea very much resembles that which is observed in delirium tremens or low fever, and that it simply indicates profound asthenia. The alterations in the cord are much the same as those in the brain, and often bear much resemblance to those which are met with in tetanus. If embolism is a cause of chorea it ought also I think to produce the allied diseases hysteria, epilepsy, tetanus. Another reason which seems to me of weight, and which Dr. Ogle urges, is the occasional sudden appearance or disappearance of the disease from mental emotion, which can hardly be thought to cause or remove thrombosis of the vessels. Lastly, I may say that there seems no more reason for requiring a demonstrable lesion in chorea than in many cases of Insanity or Delirium Tremens between which and Chorea a considerable analogy certainly exists.

The third group of causes are those which come under the head of remote irritation, and whose action I denominate 'inhibitory,' believing them to act on the nerve-centres themselves in such a way as to cause disorder and depression. To enumerate all the possible agents of this kind would be difficult, but we may mention four of the principal, viz., intestinal irritation, pregnancy, meningitis, and bony intra-cranial projections. Intestinal irritation may be produced of course in various ways, being evident most palpably perhaps, when diarrhœa exists, but not less real in the opposite state when fæces are accumulated in the bowel, or when parasites have taken up their abode there. A severe case recently under my care did not improve at all until small doses of opium and Indian hemp were steadily administered, after which the amendment was rapid and continuous. Her bowels had been a good deal relaxed before the sedatives were given. The necessity of removing fæcal accumulations will be best illustrated under the head of treatment. Tænia cannot be a frequent cause of chorea, but that it may have this effect is shown by a case reported by Dr. Giles to Dr. Ogle. E. L—, æt. 9, had been ill about a month with acute chorea, had had no sleep for 4 days and nights, was never still for a moment, and with a bedsore, dry, brown tongue, sordes-covered lips, rapid and feeble pulse, she seemed rapidly sinking. Her consciousness was perfect. Joints of tapeworm had been passed. After a dose of oil of male-fern, the whole worm, 7 yards long, came away. In a few days all convulsive movements ceased, and she convalesced completely, and has enjoyed good health ever since. During convalescence a distinct mitral murmur was found on several occasions. The whole case is highly interesting, especially when placed side by side with others where vertigo, epilepsy, or other nerve-disorders have resulted from the same cause. The existence of a mitral murmur during convalescence seems to me very suggestive as to the *non*-dependence of the Chorea on co-existing mitral lesion in many instances.

The influence of pregnancy on the nervous system is unquestionable. It gives rise to a great variety of disorders, and occasionally to markedly beneficial changes. Severe frontal neuralgia, intense gastric hyper-excitability, chorea, hemiplegia, paraplegia, deafness, amaurosis, cerebral torpor, insanity, are on record as phenomena which have been more or less frequently observed. On the other hand, Dr. Churchill states that pregnancy occasionally relieves mental derangement, and mentions having seen a lady who was in a state of confirmed melancholia, which disappeared entirely on her becoming pregnant. Asthma sometimes disappears during pregnancy, and digestion is occasionally more vigorous then than in the unimpregnated condition. The production of so many varying but similar phenomena by one cause seems to me more proofful of its efficacy than if the results of its action were more uniform. It shows that under circumstances necessarily varying greatly it acts always in the same direction. Though fibrinous deposits have been found on the cardiac valves in a few cases of fatal chorea with pregnancy, leading to the suspicion that endocarditis rather than pregnancy was the causal condition, it remains indubitable that pregnancy gives rise to other nerve-disorders for which no such causation has been suggested. Romberg describes the chorea of pregnant females as almost always bilateral, the muscles of the face and tongue being invariably affected. "The intensity of the movements is very marked, and they are often complicated with convulsions of an epileptic character. Many complain of a sense of numbness in the affected parts. The brain is almost invariably affected, and this is shown by headache, vertigo, a wild expression of the features, rolling eyes, unconnected speech, loss of memory, and great irritability. In a case related by Levick, the irregular movements and abnormal sensations were such as entirely to prevent sleep. They were almost entirely confined to the lower limbs. The feelings she experienced were of the most wretched kind, utterly unfitting her for attending to her domestic duties. The disorder came on about the end of the fourth month of her 5th pregnancy, and what is remarkable, was greatly aggravated by lying down by day or night. Morphia and Hoffman's ether brought great improvement, so that she went her full term. Only morning sickness occurred in the former pregnancies. The following case recorded in the 'Lancet,' 1868, Vol. II, p. 479, is of much interest.

Case 5.—S. C—, æt. 20, married, admitted January 15th, with severe chorea of 3 weeks' duration. It was her third attack. The first occurred when she was 12 years old, the second in her first pregnancy, which went to full term, child alive and well, 11 months old. Is now pregnant in the 7th month. No uterine pain. Convulsive twitches affect the entire body, are continual while she is awake, absent while asleep, most marked on right side. The patient looks frightened, grinds her teeth incessantly, and smacks her lips. Is quite conscious, but replies to questions very indistinctly. Pulse 132. Loud systolic murmur at heart's apex, also at base, both sounds roughened at midsternum. Bowels costive; appetite fair; in the evening the patient became more restless, throwing all the bedclothes aside. Constant watching by an extra nurse was required to prevent her injuring herself against the bedstead. There was frequent opisthotonos. She complained of aching pain in the limbs and mouth. Abortion occurred the next day, the uterus contracted well. For more than 24 hours after the jactitations were very severe, and she became so noisy that she had to be removed to the delirium ward. Chloroform was administered, but the movements continued afterwards as severe as they were before. She slept at intervals for 5 to 60 minutes. Liq. Potass. Arsenit. ♏3 + Pot. Bromid. gr. 6 in Mist. Pot. Citr. was given *ter die*. On 18th the disorder was subsiding, the murmurs were still present, she had more sleep. After January 20th she took reduced iron. February 9th she was discharged, no cardiac murmurs being audible. There was no evidence of any prior attack of rheumatism. It does not seem to me doubtful in this instance that the pregnancy was the main cause of the chorea, that it deranged the motor centres and to some extent the intellectual, and that the disorder subsided on the removal of the irritation. That the murmurs were not dependent on organic lesion of the valves seems to me almost as certain."

The circumstance that osseous projections from the inner surface of the skull may cause Epilepsy, vertigo, and probably severe headache, makes it not improbable that Chorea may be generated in the same way. I am not aware that this cause has been previously pointed out, nor would I absolutely affirm its validity, but I think the following history is well worthy of consideration.

Case 6.—H. E—, æt. 24, admitted April 28th, 1865, under the care of Dr. Sibson. He has had Chorea the last 14 days, and been unwell some time previously. On admission he was able to walk, but badly. He could speak a little occasionally in short jerking sentences. Soon after admission he got much worse, and was obliged to be laid upon the floor on a mattress. He got worse, was fed with great difficulty, though he had no reluctance to take food, and died the 4th day. At the post-mortem the brain appeared quite healthy, but all the vessels, large and small, were extremely congested. This was the case with the most minute. There was a clot of some size and fluid blood on the upper surface of the tentorium, on the left side, beneath the posterior lobes. The cord was in nearly the same state, all the visible vessels were much congested, and in the lumbar enlargement there was a considerable patch of extravasation on the posterior aspect, gradually lessening as one advanced upwards till it was difficult to tell whether it was congestion, or the result of rupture. The cervical and upper dorsal part of the cord was very much less congested. No glomeruli or exudation was discovered on microscopic examination of either the cervical, dorsal, or lumbar regions. The grey matter was dark and well marked, and its vessels were all very full of blood, but there was no sign of textural change or of exudation. The brain was wet, it weighed 50 oz. The shape of the calvarium was peculiar, not symmetrical, and somewhat disposed to bulge towards the upper part of the left parietal bone. In two or three places, of the size of a sixpence, it was diaphanous. The whole skull was unusually thin for one of his age. The base differed from the ordinary appearance by the irregularities of the bone. Thus the orbital plates were thrown into ridges, and altogether roughened. The same tendency to irregular enlargement was also visible at the upper surface of the left petrous bone, and again the inner surface of the foramen magnum showed a well-marked bony prominence. It should be observed, however, that the dura mater was quite healthy, and that depressions corresponding to these elevations were seen on the under surface of the brain. All the cavities of the heart were filled with coagula; there was a very large fibrinous clot in the right auricle. The weight of the heart was 11 oz. As the post-mortem was carefully made, and no mention occurs of any morbid condition of the valves, it may be presumed that they were healthy. The lungs, spleen, and kidneys were healthy, the latter very pale. The liver was of a greenish colour, and very dark. The descending colon was shrunken, and contained a number of very firm scybala, which were of a well-marked green tint, and quite dry. The mucous membrane where they lay did not appear inflamed. Mr. S. Lane, who witnessed the autopsy, expressed at once his opinion that the bony ridges were the cause of the malady. He tells me that he has seen several similar instances.

Froriep's case cited by Romberg is probably one of this kind. The odontoid process was swollen, and seemed to have caused a depression at the lower anterior surface of the medulla oblongata, where the membranes were opaque and thickened laterally. The Chorea was very severe, the patient's face was crimson, and there were all the symptoms of violent congestion of the head. After a night of uninterrupted convulsions, which successively increased in violence, death ensued from apoplexy. The vessels, large and small, were gorged with blood, but the cerebrum, cerebellum, and pons were normal.

Limited inflammation of the dura mater appears from Sir T. Watson's experience to be occasionally the cause of the malady, local bloodletting then proving curative.

In his excellent article on Chorea in Reynolds's 'Syst. of Med.,' Dr. Radcliffe remarks, after reviewing the facts contained in Dr. Hughes's report, that their tendency is to show "that structural disease of the great nervous centres is no necessary accompaniment of chorea, and also that no one centre is affected exclusively when such disease is present." He states that he has seen two cases of chorea in children which ended in cerebral meningitis, and one case in a youth of severe chorea which ended in inflammatory disorganization of a considerable portion of the spinal cord. A very similar case is recorded in the 'Med. Times and Gaz.,' 1865, Vol. II, p. 140, though the writer seems to regard the myelitis as the cause of the Chorea. The patient was advanced in pregnancy, and had received a mental shock to which she attributed the disease. Abortion occurred, and she died on the 9th day. I can hardly take any other view of this case than that expressed above by Dr. Radcliffe, that the lesions discovered at the post-mortem were results of the chorea, and stood in no causal relation to it. Romberg relates two cases in which after death inflammatory lesions were found, in one the brain and its membranes were affected, in the other the peritoneum and bowels. In both the chorea had pre-existed for some time. In one of Dr. Ogle's cases the lungs were loaded with blood, and at their bases contained patches of hæmorrhage, in three one or both lungs were partly solidified. In one of Dr. Hughes's cases of simple Chorea there was slight pleurisy and pneumonia, with patches of ecchymosis beneath the visceral pericardium and endocardium, and staining of the coats of the aorta. In some instances the inflammatory lesions may have resulted from rheumatism, as in a case related by Trousseau ('Clin. Med.,' Vol. II, p. 170), but this is not, I think, the most frequent case. The hyperæmia, extravasation, and softening which are met with not uncommonly in the encephalon and cord, have been already noticed. The most constant change observed however, in fatal cases is the occurrence of fibrinous vegetations or deposit on the valves of the heart. Putting together 18 cases of Dr. Hughes and 16 of Dr. Ogle's, we have 34 cases of fatal chorea, and in no less than 18 of these the above-mentioned alterations were found. There are besides 4 cases in which the valves were thickened or opaque, a condition probably of old standing; 2 in which the heart was healthy, and 3 in which it was not examined.

It is worth notice that in 2 of Dr. Hughes's fatal cases in which the chorea had no concern in the ultimate event, 1 case being nearly well, and the other steadily improving, the mitral valve was the seat of more or less distinct fibrinous deposit. Both patients were young children, æt. 7 and 5 years; so that it might have been expected that the chorea should have persisted according to the view which assigns special importance to the valvular lesion. It is also markworthy that among the whole 18 (16 examined) there is scarce one instance where any lesions were met with indicative of the existence of embolism. The only case about which some question might be raised is one in which the fornix and the edge of the third ventricle was soft, red, and tumid, and the cord was slightly softened. The same may be said of Dr. Ogle's cases. As before remarked this absence or indefiniteness of lesions of the nerve-centres does not accord well with the notable frequency of deposits on the cardiac valves, supposing Dr. Kirkes' view to be correct. However, leaving this question, it is clear that the frequency of fibrinous formations on the valves, their presence having been ascertained in more than half of the fatal cases, is a settled point. The interpretation of their genesis and of their relations to the choreal symptoms is as yet obscure. Dr. Ogle is inclined to regard them as results of some antecedent general condition of the blood common also to the choreic condition. For instance, the fibrine may be in excess, or may be unduly precipitable in consequence of some unwonted elements within the blood, some result of tissue metamorphosis produced by the excessive muscular action and other functional disturbances; "thus being not in any way related to this state as a cause but as a consequence." This is very probable, but with respect to the vegetations being formed in the way of deposit from the blood I should mention that in one case under my own care (v. 'Brit. Med. Journ.,' 1866, Nov. 3rd) they appeared to be evidently outgrowths from the membrane; the nuclear corpuscles, spherical and elongated, of which, together with granular matter, they consisted, were deposited in various places among the normal fibres. The brain in this case was wet, rather pale, weighed only 38 oz.; it was quite healthy everywhere, only some of the precapillary vessels were extensively coated with granular deposit. The cord was normal. The symptoms were intense chorea, delirium, and prostration. At first they set in mildly, but increased till they were calmed by chloroform, 5 days before death by asthenia, with a temperature of 103°. The patient was a female, æt. 18, had never had rheumatic fever, was ill 15 days.

The urine has been noted by Walshe and Bence Jones to be of high sp. gr., containing an excess of urea, and depositing lithates and oxalates freely. Dr. Radcliffe has most frequently noticed a disposition in the urine to become rapidly phosphatic. The general results of some observations I have made are as follows—(1) In tolerably severe cases, during the full sway of the disorder, the urine may be of high sp. gr., 1030—1040, contains an excess of urea, often crystallizing copiously with half its volume of nitric acid, deposits sometimes lithates, sometimes phosphates, its colour is full, and on boiling with one fourth its volume of muriatic acid it darkens extremely. (2) The total amount of urea and of phosphoric acid excreted in 24 hours may be greatly in excess. (3) In convalescence the sp. gr. falls considerably, the colour becomes paler, there is less darkening when the urine is boiled with muriatic acid, and the amounts of urea and phosphoric acid may diminish to less than one half. (4) The bodily weight increases during the period of convalescence. (5) It does not appear that the nervomuscular agitation determines the increased excretion of urea, as the latter may be very marked in the paralytic form of the malady.

The view which I take of the pathological events in chorea is the following. The motor centres especially, and also not unfrequently the intellectual, emotional, and sensory, in persons of weak organization, fall into a state of paresis, either in consequence of a shock or more gradual injury, or of some toxic matter in the blood, or of peripheral irritation, all of which may generate the same peculiar condition. The paresis in all these parts may take the form of hyperexcitability or of paralysis, the former being much the most frequent. The nerve exhaustion, aggravated more or less by the jactitations, involves the vaso-motor nerves of the cerebral and spinal arteries especially, and conditionates relaxation of their muscular walls and consequent hyperæmia, as well as impairment of the tone of the capillaries and hæmorrhage. These, however, are of course not necessary events, even in fatal cases. Occasionally actual inflammation of parts of the nerve-centres results from the hyperæmia. Pulmonary congestion and consolidation may be produced in the same way, and possibly, in some instances, valvular lesions of the heart. The connection between chorea and rheumatism seems to me most naturally explained by regarding the motor disorder in just the same light as we do delirium, to which it has much affinity. In typhoid we have an intestinal lesion, and commonly delirium, but we do not assume a connection between these, but consider the specific poison to give rise to both. In rheumatic fever we have also often a lesion (cardiac) and delirium, and we usually regard both as coproducts of the cause of rheumatism, not one as the cause of the other. If we substitute motor disorder for intellectual, why need we change our view? In such a case as the fatal one above alluded to, where there was endocarditis, chorea, and delirium, with a little before death a temperature of 103°, the simplest view seems certainly that which assigns a common cause for all three, there being no evidence in the state of the brain that anything like embolism had occurred. This view that chorea is essentially a functional disorder of the motor centres is in harmony with its frequency in children and females whose motor apparatus is more prone to be weak and irritable, with its affinities to epilepsy, hysteria, paralysis, and insanity, and with its relation to various causes. Chorea is doubtless, as Dr. Radcliffe writes, essentially a feverless malady; but elevation of the temperature, as in pneumonic complication, does not necessarily do away the chorea. A child under my care had for 2 or 3 days a temperature of 104° by reason of intercurrent pneumonia, the chorea persisting unmodified.

An apt illustration of the production of the disorderly muscular action in chorea may be taken from the spectacle of a company of recruits trying to fire a volley. The discharges of the rifles are not simultaneous, as they would be in the hands of trained soldiers. Just so in the choreic nerve-centres the multitudinous nerve-cells do not effect their discharges of force in a combined orderly way. This probably depends on defective action of the commissural fibres. In both cases education (drill) effects much improvement.

We may next notice certain peculiar symptoms occasionally met with in chorea, some of its modifications and affinities to other disorders. Dr. Levick mentions a case in which, with a want of control over the muscular movements, there was also a want of control over thought and utterance, so that one of the most distinguished physicians was usually greeted on his entrance to the ward with a salutation not suited to ears polite, to his own surprise and the evident mortification of his patient. The same writer relates the following instance of *partial* chorea, or of what Sir C. Clarke termed "salaam convulsions." A girl, æt. 4, a bright, intelligent child, was found soon after her admission sitting up in bed nodding her head almost to the knees, uttering, at the same time, a low moaning cry. It was ascertained that these movements were beyond her control, that they lasted from 5 to 10 minutes, or in some attacks much longer, that they occurred in paroxysms, and that they varied much in intensity. An attack would often be brought on by the visit of the house-surgeon, when the little one would salute him in her pleasant way with "Good morning to the doctor," repeated 2 or 3 times, and then be seized with this violent bobbing motion, lasting many minutes, during all which time she would continue humming her strange chant. Under treatment including aperients and tonics she entirely recovered. Dr. Radcliffe relates a very curious case under his own care, the subject of which, an acute, clever, accomplished, amiable girl, but nervous, excitable, and with a feeble circulation, suffered first for 3 years with paroxysms "of making faces," and of bobbing her head forwards, then with attacks of alternating semi-rotation of the head, and of rapid vaults, by which the body was thrown round and round, resting upon the arms. These were succeeded by great exhaustion. At a subsequent period her "mind was in a rapt or entranced state, and now and then words escaped which showed that she was absorbed by some alarming dream or vision. At those times the eyes had a fixed stare." She recovered completely. Another case was that of a male, æt. 22, who had epileptic attacks, and also "a curious pursing up of the mouth, attended with frequent shruggings of the right shoulder and tossings out of the right leg. He also had attacks of shuddering, so violent as to shake things out of his hand, or himself out of his chair or bed; and lastly, fits of turning, in which he got up, turned round and round perhaps 20 times, and then sat down again. If he resisted the impulse to turn he felt much agitated afterwards. The following history ('Lancet,' July 16th, 1864) describes a similar condition.

Case 7.—A girl, æt. 14, non-menstruated, of healthy appearance, who had never been ill, except with a short intermittent fever, has been 2 years in the hospital at Milan with the symptoms mentioned below, which have resisted all treatment. The only possible cause seems to have been a fright. Every day precisely as the clock strikes 1 p.m. she begins to shake her head from right to left, gently at first, but with ever increasing rapidity; and so great is the velocity these movements attain towards 3 p.m., that it is almost impossible to distinguish her features. Her long hair is wafted in all directions, her mouth is firmly compressed, and her fists are clenched. From time to time she bursts into a violent fit of laughter. The pupil is contracted, but there are no muscular twitchings in any part; consciousness and voluntary motion remain unimpaired. Exactly at 3 p.m. the paroxysm terminates, she falls back in a state of complete exhaustion, panting for breath and covered with profuse perspiration. She eats her dinner with appetite at 4.30. At 5 p.m. she falls into a state of complete insensibility, and remains so till 5 next morning, from which time till the recurrence at 1 p.m. she is perfectly calm and sensible.

Sir T. Watson relates several similar curious histories, and Dr. Radcliffe, in the article 'Chorea,' and Dr. T. K. Chambers in that on 'Ecstasy,' have given some notices of the strange epidemic pathemata of this kind which prevailed in the latter part of the 14th and commencement of the 15th centuries. The last example I have cited is a good one of Chorea *oscillatoria,* as it is called; the following is one of Ch. *saltatoria.* A young boy was brought to Trousseau, and while his father was giving an account of his condition, he started up as if impelled by a bent spring let loose, sprang on the top of a piece of furniture with marvellous agility and litheness, then came back and sat down quietly. His intellect was quite clear, and in the intervals he was perfectly tranquil. The disorder had come on suddenly. A lady patient of Dr. Abercrombie's would leap sometimes on the top of a wardrobe fully 5 feet high. Subsequently she had semi-rotatory movements of the head, which continued without intermission night and day on one occasion for 3 weeks, when they ceased on the occurrence of menstruation in a more full and healthy manner than it had done for many years. She remained well. In chorea *festinans* the patients are impelled irresistibly to run forwards or backwards. A gentleman under Trousseau's care had much difficulty in walking in an ordinary way with the sole of his foot on the ground, but was compelled to run quickly on the tips of his toes, making short steps, with his trunk stiffened and bent forward, and his gaze fixed, so as to excite the amused attention of lookers-on. He had been ill about a year, felt physically and mentally (moralement) weakened, could hardly manage his business, and his speech was rather impaired, but he had no real muscular weakness or loss of sensibility. Ol. Tereb. ♏ 100 per diem, and afterwards the baths of Néris, warm saline, producing sedative effects, were employed very beneficially.

More frequent than the foregoing are less severe instances of partial chorea, consisting in involuntary hasty contractions of a small group of muscles, most frequently those of the face. Winking of the eyelids, wrinkling of the skin of the nose, shrugging of one shoulder, nodding of the head, and numberless other similar spasmodic actions, come under this head. They are very difficult of cure, and if chased away from one site they presently occupy another. Their persistency is exemplified by a story which Trousseau tells of one of his college companions whom he had not met for 20 years, but whom he recognised one day by hearing a well-known barking sound behind him, which his friend habitually uttered during their college days. In such cases there is probably a convulsive contraction of some of the expiratory muscles. Sir T. Watson mentions the case of a hospital patient, an hysteric he deems her, who would sit in her bed all day long uttering, every 8 or 10 seconds, a loud and most discordant hiccup. This was probably a *tic* of the diaphragm.

That stammering may be a choreic manifestation is I believe generally allowed, and I remember myself hearing from a mother who had had chorea herself in early life, that one if not more of her children stammered badly. Romberg says that it is met with associated with strabismus and chorea. The following illustrative case is related by Trousseau ('Clinique Med.,' Vol. II, p. 205).

Case 8.—A young woman, æt. 19, was frightened and agitated, and in consequence suffered acute suppression of the catamenia. Immediately came on a convulsive agitation accompanied with jerking movements of the limbs and trunk, so uncontrollable as to prevent her maintaining the erect posture. The tongue was equally affected, and the patient was unable, not to articulate words, but to connect syllables together. It was a strange sort of stuttering, consisting in this, that she repeated with extraordinary volubility and for a very long time without stopping the last syllables of the words which she tried to pronounce, the first being uttered with difficulty. When she sang this stuttering did not occur, and her speech appeared normal. Simulation was suspected, but was negatived by the convulsive movements continuing the whole day without a minute's pause, and being suspended only during sleep. Here it may be said there was chorea of the muscles concerned in station and locomotion, and also of those which subserve articulation.

In most cases of severe chorea, the faculty of speech is more or less impaired, though it is not easy to determine always whether the articulating muscles are most at fault, or the expiratory, which send a current of air through the glottis. Dr. Ogle mentions a liability to choking whilst eating as a symptom in one of his patients; and one of my own had notable difficulty in deglutition. The possibility of this occurrence should not be forgotten, as incautious feeding might give rise to fatal obstruction of the glottis. Romberg has met with three instances of more or less contraction of the glottis in association with chorea. The first was that of a female, æt. 48, who had been choreic 8 years; she suffered from an annoying hiccough, inspiration was often accelerated and accompanied by a loud whistling sound such as we meet with in contractions of the glottis. In a child of 8 years the choreic movements of the right half of the body were associated with dyspnœa, whistling inspiration, and palpitation. The third was a boy of the same age, who was first attacked with chorea about Easter, 1847. At first only the muscles of the extremities, of the face, and the eyes were attacked. The affection subsequently left these parts and seized upon the muscles of respiration. When examined in January, 1848, every now and then a rapid and short concussion of the thorax was perceived, invariably accompanied by a brief snapping noise, which originated in a spasmodic condition (closure?) of the glottis. Traces of chorea were still apparent in the upper extremities.

It seems probable that no muscular structures are altogether exempt from choreic affection. Dr. Pepper (Levick) has known incontinence of urine to interchange with chorea of the external muscles, and conversely. Nervous diarrhœa might be regarded as a kind of internal chorea, and some cases of so-called hysterical vomiting might very well be grouped under the same head. That the cardiac muscle is affected in a like way is highly probable from the disappearance of murmurs which at one time were evident, but it needs more evidence to prove this important point. Dr. Ogle, however, mentions in Case 5 that the heart was healthy in all respects, though murmurs had existed which I should have regarded as of organic origin. They disappeared, however, a week before death.

The definite disorders with which Chorea has affinities may be enumerated as Epilepsy, hysteria, paralysis (neurolytic), and delirium. I have in the Chapter on Epilepsy cited a case of my own where epileptiform Attacks were replaced by chorea; and Dr. Addison in his 6 cases of Chorea treated by Electricity, mentions 3 in which

Epilepsy also occurred, and one where two other children were epileptic, and another idiotic and blind. Sir T. Watson writes that the mind is affected in the same way, and often shows the same varied, desultory, and causeless emotions as in hysteria. Dr. Ogle mentions the occurrence of hysteria in two fatal and in two non-fatal cases. With non-organic paralysis chorea is closely related, as appears by the jactitations being sometimes replaced by this condition, by the great weakening of the muscular power in the affected parts, and by the fact which I observed in two of my cases, that the muscles were by no means readily responsive to the interrupted current. Dr. Bright points out a connexion between chorea, hysteria, and the delirium of drunkards, founded on the view that different parts of the nervous system are affected in these different pathemata, the motor centres in the first, the emotional in the second, and the intellectual in the third.

The following may be cited as a good instance of hysterical chorea (v. 'Lancet,' March 2nd, 1867).

Case 9.—J. N—, single, cook, admitted December 24th, 1866. She had frequently had rheumatic pains, and 12 years before had suffered from rheumatic fever, lasting 8 weeks. No family history of fits, but phthisis on mother's side. She had long suffered from menorrhagia and leucorrhœa. Aspect hysterical, not very anæmic. Her present illness commenced 6 weeks before admission without any apparent cause, and consisted in severe convulsive movements, chiefly on the left side of the body. For the first 3 weeks the attacks came on only during the night, but subsequently they became more severe, and occurred in the daytime as well as at night. After her admission the fits presented the following characters. They commenced with a choking sensation like globus hystericus, and successive efforts at deglutition. These were soon followed by violent muscular agitation, confined for the most part to the head and left side of the body, and interrupted occasionally by severe spasmodic rigidity of certain muscles, as the result of which the head was drawn sometimes to one side and sometimes to another, and occasionally there was a condition approaching to opisthotonos. The movements were so violent that the patient must have hurt herself if she had not been in bed, any attempt to restrain them only made them worse. The attack was not preceded by any scream, or accompanied by any loss of consciousness or pain. The patient would converse freely while the movements were going on, and with her right hand endeavour to restrain the movements of her left; and what was more remarkable, the movements were to some extent under the control of the will. In the midst of a fit she could pick up a pin or a card and hold it with her left hand, which went directly at the object and grasped it, the movements being for a few moments suspended. Sometimes she had to wait a few seconds before trying to seize the object. The duration of the fits varied from a few minutes to several hours. She had 5, 6 or more during the day, and often they appeared to be induced by excitement as at the hour of visit. There were no movements during sleep, and never any in the intervals of the fits. Pulse 84, regular. No headache. Slight strabismus, left eyeball when she looked upwards, drawn upwards and outwards more than the right. Left pupil one third larger than the right. It appeared, however, that from childhood there had been something peculiar about her eyes. With Zinci Valerianat. gr. j + Ferri Sulph. gr. j + Extr. Gentian gr. iij, *ter die*, she got much better, so that on January 7th the fits consisted of little more than slight muscular twitchings. She was up and about. Dr. Murchison remarks that the case differs from true chorea; (1) in the complete intermission of the movements during the intervals of the paroxysms; (2) in the patient's ability to control the movements to some extent. This latter, however, is also a feature of ordinary chorea.

In these days of 'eclipse' of medical faith doubts have been expressed as to the efficacy of drugs in the treatment of chorea, and it has been thought that supposed cures were only recoveries. I admit that I have seen cases in which I have employed many remedies without obtaining any decided proofs of their exerting any curative influence, and where the ultimate recovery has appeared to be much more owing to time aided by rest and diet and care than to any pharmacopœial preparation. But I am also satisfied that I have seen instances in which drugs were of great utility, and the following details published by Dr. Fraser show this I think pretty conclusively (v. 'Med. Times and Gaz.,' 1865, Vol. II, p. 140). One case was treated by diet and purgatives for 15 days without benefit, then was cured in 10 days by arsenic. Another after 3 months' dieting without benefit was cured in 26 days by arsenic. A third case after 18 days' careful dieting with no good effect was cured by arsenic in 25 days. All these had taken purges of calomel + jalap. Another case was that of a girl, æt. 7, who took 178 grains of Valerianate of Zinc without benefit. Arsenic had no better effect. She ultimately got well with ʒj doses of Ferri Sesquioxyd. *ter die*. In one case chloride of arsenic was useful when the ordinary preparations had failed. In another a girl, æt. 10, got well under the use of Chloride of Arsenic, after all the ordinary remedies had been employed 3 months fruitlessly. This case was at one time in great danger, the jactitations were so severe that it was very difficult to feed her.

The treatment of Chorea must clearly be regulated by the view we take of its causation in each instance. If we regard the disorder as a simple paresis the employment of stimulants, tonics, and nutrients suggests itself naturally. Yet we must remember that even in this condition tonics are not always well tolerated by an hyperæsthetic system, and that they may need to be preceded by sedatives. What is said regarding the treatment of headache may find its application here. If it appear desirable to have recourse to sedatives, I should in ordinary instances, not of great severity, prefer a combination of Opium, Hydrocyanic acid, and Indian hemp; but if the disorder was extremely severe, imperilling life, I should have recourse to prolonged chloroform inhalation, or *adequate* doses of opium. By this epithet I mean doses that are capable of tranquillising the nervous agitation, and I should not reckon quantities so much as effects. In fact, we should act very much in the same way as in a case of severe delirium. Trousseau records a case in which the daily dose of Sulphate of Morphia was raised from 4 grains to 12, 20 and 30 grains before the disorder was subdued. The good effects of the remedy were evident, and the patient's stay in the hospital did not exceed 27 days. The use of these large doses, of course, requires judgment. We must satisfy ourselves that the remedy agrees, and at least is not injurious in smaller doses before we push it to larger. The possibility of the opium depressing dangerously the action of the heart must not be forgotten, and this thought would lead me in all such cases to administer alcoholic drinks freely, as Dr. Radcliffe advises, at the same time that I was giving sedatives, always supposing that they were well borne, which I believe would generally be the case. The disorder, when severe, is eminently exhausting, and measures conservative of the strength are plainly demanded. Probably most cases of simple paretic chorea would be benefited by moderate doses of alcohol in some suitable form. Dr. Radcliffe has seen great benefit result from the administration of egg beaten up with sherry or brandy. In a severe case lately under my care, a child, æt. 5, took for many days 2 oz. of brandy, or 2 oz. of port and 1 oz. of brandy, with evident advantage. As to tonics, I know of no general rules to determine what particular drugs are to be preferred. I am afraid that the idiosyncrasy of the patient must rule our choice. Arsenic, Zinc, Iron, Quinine, may all do good service, but tact and skill have scope enough in selecting and adapting the remedies to the individual patient. Few tonics are better than good Tr. Cinchonæ flavæ. Oleum Morrhuæ should be given whenever it is well borne; a dessert-spoonful once a day, with the addition of a little ether, will generally suffice. Shower baths, plunge baths, and sulphuret of potassium baths are also appropriate to cases of this kind, but must not be used too indiscriminately. To very sensitive and timid persons the two former might do more harm than good. In a very refractory case related by Graves recovery seems to have been chiefly owing to the persevering use of tepid salt-water douche or shower baths *ter die*, the patient being at first of necessity held by an assistant, who was destined unavoidably to enjoy the bath along with her. The following instance of the good effects of *Valerian baths* deserves to be mentioned.

Case 9.—A strong female, æt. 21, during her first pregnancy fell ill with mental excitement and chorea, which soon succeeded. She aborted and all the symptoms immediately vanished, and the patient remained well until another pregnancy occurred. In the 4th month of this, severe chorea again set in, and proved refractory to various antispasmodics (Camphor, Valerian, Oxide of Zinc, Dippel's oil, Opium, Belladonna) as well as to Electricity. Before resorting to premature delivery, a trial was made of a prolonged warm bath with valerian, which produced a surprising calm. Recovery was soon brought about by the continued use of these baths. (Demore, 'Gaz. des Hôp.,' No. 149, 1866.)

Trousseau thought that *Strychnia* was more advantageous than any other remedy, and usually employed it. He gave it in such doses as to produce some amount of intoxication. My own experience of its effects has not been very encouraging, but I have not used it largely in chorea, nor have I given toxic doses. It would not, however, in the least surprise me that London patients should require a different medication from Parisian, considering the different atmosphere and modes of living, and I am also quite prepared to admit the correctness of Baudelocque's and Bouneau's observation, viz. that in the course of 8 or 10 years they had been obliged to alter their treatment of chorea, which was at first cured rapidly by cold, while some years later sulphurous baths were found necessary, and at a still later date these became ineffectual and had to be replaced by preparations of iron. Of course those who believe that forms of disease are stereotyped and unvarying will reject such a statement, but Trousseau saw in it the fulfilment of a great medical law, and so do I.

Dr. Murchison has recorded a case in which the good effects of strychnia were conspicuous.

Case 10.—E. B—, æt. 15, was admitted on March 23rd with chorea, which had commenced a month before on the left side, but was now engaging the right. In spite of Bromide of Potassium, Belladonna, and Cannabis Indica, and Sulphate of Zinc, she got worse, so that on April 10th she was becoming much exhausted, was unable to talk, had great difficulty in swallowing, and could not be fed without much trouble, owing to the violence of the convulsions. Her urine was passed in bed. Strychnia was now ordered, gr. $\frac{1}{10}$ 4*tis horis*, and brandy ʒij 2*dis horis*. Improvement commenced immediately, and in 8 days the movements were very slight. The dose of strychnia was gradually raised to gr. $\frac{1}{10}$ 4*tis horis*. The remedy was omitted May 28th, and the patient discharged June 7th. After the jactitations ceased the left arm remained almost paralysed, but rapidly recovered. ('Brit. Med. Journ.,' 1869, Aug. 21st.)

In not a few cases electricity is beneficial. A girl, æt. 9, recently under my care, derived no material advantage from aperients with nitro-muriatic acid, conium, physostigma, tartar emetic, but improved rapidly with faradization. I could not but question with myself on seeing the success of this remedy, which can hardly act otherwise than by stimulating the peripheral organs, nerve trunks and muscles, whether some choreas may not depend chiefly on peripheral disorder, the centres, at any rate the larger, being little if at all affected. From a therapeutical point of view the matter is worth consideration. The continuous current (galvanization) succeeds sometimes when the interrupted fails.

Case 11.—A boy, æt. 16, had rheumatic chorea with persistent mitral murmurs. The jactitations were slight; the most marked phenomenon was impairment of the grasping power of the hands, of the left especially. At the same time there was a degree of tonic spasm of the extensors, so that forcible flexion of the fingers caused pain referred to the back of the hand. Iron, Strychnia, Ol. Morrh., Arsenic and a spinal ice-bag made no essential change in state of the left hand; when he left the hospital he could not squeeze my hand at all, could not flex his fingers. Three days after, I galvanized him, carrying the positive pole along the spine from the nape of the neck to the loins, the negative remaining in the left hand. In a quarter of an hour after, he was able to close his fingers. The galvanization was repeated once, and he continued the arsenic and oil which he had been taking in the hospital. The improvement was maintained; 19 days later he could squeeze my hand pretty firmly, but not so strongly as with the right.

Static electricity seems to have proved of singular service in some cases. Those related by Dr. Addison are well worth perusing (v. Syd. Soc. edit.). The patient is insulated and charged from the conductor, and sparks are then taken from along the spine. In amenorrhœal females shocks from a Leyden jar are made to pass through the pelvis. These measures have proved successful in cases which presented a most unfavorable appearance. G. Bird reports 30 out of 37 cases completely cured, 5 relieved, and only 1 unbenefited. He affirms that the facility with which the patients were relieved was nearly proportionate to the facility with which the papular eruption on the skin took place.

Regulated gymnastic exercise is often useful in chorea, even when the latter is rather severe. Trousseau recommends its employment, but only as an accessory means, and says that it does not avail much until the malady is drawing towards its close. The method is as follows:—For the first 3 or 4 days passive exercise alone is employed, the trunk and limbs being rubbed and moved. For the next 8 or 10 the limbs are made to perform regular movements, and after this the patients are able to go to the gymnasium and pursue systematic exercises. These consist in certain movements, at first simple, and afterwards more complex, which are accompanied with regular chants, in which as well as in the movements the class endeavour to follow their leader. Great improvement occurs during the first 10 or 12 days of the gymnasium, then there is a check, and after this improvement proceeds steadily. Choreic grimaces and contortions may be treated on the same plan. The beneficial effect results, no doubt, from the improvement produced by the exercise in the functional power and orderly working of the motor nervous apparatus. It does, in fact, for the disorderly muscles what discipline and training does for a mob.

The *quality* of the nerve disorder in Chorea is not always such as to make it desirable to administer tonics, even when the nerve centres are primarily affected. Certain cases are beneficially treated by tartar emetic. My friend Mr. Gay informed me of a case in which many remedies had been ineffectually administered, but which recovered with small doses of this. Gillette ('Ann. de Thérap.,' 1859, p. 102) advises it to be given for successive periods of 3 days with intermissions of the same length. He administers it in increasing doses, so that on the sixth day of its use the patient takes 9 grains. Vomiting and, I presume, prostration are not desirable. Skoda relates a case of severe general chorea cured in 5 days by the free administration of tartar emetic and cold douches to the head. He seems to consider the immediate cause of the disorder to be an exudation in the spinal cord or in the brain. It is probable that the cases where this medication succeeds are of sthenic character, and are analogous to those of delirium in which the same remedy sometimes answers so well.

Physostigma is another remedy which has occasionally rendered good service in obstinate cases. I have used it a few times, but have not seen any striking results from it. A case, however, is recorded ('Lancet,' 1865, Vol. II, p. 376) of an average severity, where recovery ensued gradually and steadily under the use of this remedy, although previously the disease seemed to be making progress. The dose may vary from gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$ of the Extr. Phys. of the B. P., or ♏$\frac{1}{4}$ to ♏$\frac{1}{2}$ of Bell's Liquor Physostig. Both the two last-mentioned drugs have the drawback that they may act injuriously by depressing the action of the heart, and are consequently not to be lightly administered in cases where the pulse betrays any liability to cardiac failure. In doubtful conditions the addition of stimulants may render their employment safe.

Bromide of Potassium has been fully tried by Dr. Radcliffe, but though he was strongly prejudiced in its favour at first from its efficacy in Epilepsy, he pronounces its results unsatisfactory. In one case where I gave it it seemed to do more good than the ice-bag or valerianate of zinc. MM. Gubler and Dumont state that it was very beneficial in a very severe case, where the patient was 5 months gone in pregnancy. The doses were not large, 30 to 45 grains daily, and the cure was complete in 8 days ('Arch. Génér.,' 1865, p. 353).

When we diagnose a toxæmia as the causative condition of chorea, our treatment must often be modified. The indication, of course, is to remove the cause—the toxic matter—if we can. If, however, which may well be the case sometimes, we cannot, we are not therefore disarmed. We may be able to do much to uphold the nervous system in its weakness and to calm its disorder, though we cannot prevent the action of the morbific cause. We can act as we do in snake-bite and low fever. On this I need not dwell. When we have determined the particular kind of toxæmia, the appropriate remedy is also for the most part sufficiently clear. Syphilitic and rheumatic pathemata must be dealt with on the general principles which would guide us in dealing with epilepsy, cephalalgia, or other disorder attributable to the same causation. In amenorrhœal girls Sir T. Watson's experience leads him to think oil of turpentine a valuable medicine. He says "when the bowels are torpid, and the girl is of that age when menstruation may be conjectured to be at hand, its arrival seems sometimes to be accelerated, and great relief to be produced by the turpentine." The dose is ʒij with as much castor oil every morning, or every other morning, according to its effect upon the bowels. Electrical shocks, or faradisation might be serviceable by their emmenagogue operation in some instances. The principal occasion, however, for eliminant medication is where intestinal excretion is defective, here purgation is of marked advantage. Dr. Prichard states that he saw a boy who had nearly the aspect of an idiot after a long and severe chorea restored by a course of purgative medicines. Dr. Hamilton's cases prove that purgation may be curative even when the general state seems to contra-indicate it. A boy, æt. 8, under his care, was emaciated and exceedingly puny, and his abdomen lank; but he recovered after having had during ten days a most wonderful discharge of fæces, nearly equalling in weight (as H. estimates it) that of his whole body. It is very markworthy that the appearance of the fæces is sometimes healthy at first, then becomes unnatural, "black and fœtid," and subsequently healthy again. Such changes appear to me very indicative of increased excretory action in some part of the intestinal tract. The best drugs would probably be podophyllin, extract of colchicum and aloes, with nitro-muriatic acid in a bitter infusion, to aid in improving the general tone and vigour. It may often be difficult to determine at first whether all that is needed is to remove fæcal accumulations, or whether the intestinal follicles and glands require continued stimulation. Very probably both states often coincide.

As regards cases depending on remote irritation, the diagnosis of the cause will generally suffice to direct the treatment. Should the cause be difficult or impossible to remove, as in the case of pregnancy and projections from the inner table of the skull, we must remember that we may be able to attenuate the effect, though we cannot do away with the cause. It is certain that the irritation often continues a long time before any evident effect is produced. During this time the resisting power of the nerve centres is being gradually impaired, and when the impairment has reached a certain point, the malady breaks forth. Our object should be to reverse this deterioration, and to bring the brain back to the state in which it was somewhile before the symptoms appeared. Opium in large doses, chloroform, alcohol, cinchona, and a generous diet are the medicinal means most likely to avail. To these I would wish to add in all cases a pure suitable air. Unacceptable as the doctrine is, I cannot help believing that chorea, and very many similar disorders, would be very much better treated in the country air than in large towns.

The following cases are recorded partly for the sake of giving the details of some urinary analyses:

Case 12.—C. G—, æt. 5, was fat and well April 1st, after a recent severe attack of chorea, which began about Dec. 11th. No known cause; never had rheumatic fever. A systolic mitral murmur had existed in the first attack, but ceased before she was discharged. April 24th.—Her mother complained that she had been getting worse about 14 days. She could not sit still; was unsteady in walking; restless at night, waking up with starts; speech had become impaired the last two days. "She gets into violent tempers, screams and cries for anything she wants, gets so excited and rushes about," that her mother is almost obliged to let her have her own way. May 1st.—An attack of lingual herpes. May 8th.—Improved. May 30th.—Is materially worse. Urine of 29th = 18 oz., sp. gr. 1035; total urea = 410 grains; total phosphoric acid = 29·88 grains; bodily weight = 41½ lbs. June 5th.—Very unsteady; total quantity of urine = 18 oz., sp. gr. 1032; total urea = 438 grains; total phosphoric acid = 31 grains. July 15th.—Highly choreic still; cannot get off her bed by herself; she wriggles, and strives, and sprawls about, but cannot succeed. Her weight is 39 lbs. Urine in 24 hours = 20 oz., sp. gr. 1039, barely acid; total urea = 560 grains. She was now ordered Strychniæ, gr. $\frac{1}{20}$ + Ferri et Quin. Citrat. gr. iv + Acid. Citrici gr. iij + Spt. Æth. Chlor. ♏v + Aq. ʒj, *ter die*. July 28th.—She can get off and on the bed with much ado by herself, and can stand and walk, though very insecurely, holding by the sister's apron. The medicine has been increased, so that she takes it 5 times a day; no intoxication; dose of strychnia raised to gr. $\frac{1}{16}$. 31st.—Omit medicine; Dr. Chapman's spinal ice-bag to be applied. Aug. 11th.—Improving; can walk alone, but unsteadily. 18th.—Chorea has now almost disappeared; weight 40½ lbs.; no murmur at heart. Total urine of 24 hours = 18 oz., pale, sp. gr. 1021; total urea = 221 grains; total phosphoric acid = 17·7 grains. When boiled with ¼ its volume of Muriatic acid it darkens a good deal, but not nearly so much as it did on July 15th. Aug. 21st.—Went out well.

Noteworthy points here are the mental state; the decrease of bodily weight during the illness and its rise during convalescence; the exaggerated excretion of urea during the acme of the disease, viz. 14 grains per 1 lb. of bodily weight, compared with the diminished excretion during convalescence, viz. 5·4 grains per 1 lb.; the similarly exaggerated elimination of Phosphoric acid, ·72 grain per 1 lb. of bodily weight, compared with that taking place during convalescence, viz. ·44 grain; the tolerance she manifested of the strychnia; the good effect of the ice-bag. The choreic tendency was very marked, as evidenced by the relapse and its long continuation, yet there was no trace of rheumatism. The cardiac murmur might be deemed such, but its disappearance makes this assumption, I think, untenable.

Case 13.—E. K—, æt. 8½, admitted May 14th, 1869, with moderate chorea. Had the same disease about 3 years ago; never had rheumatic fever. Heart's sounds are normal. Is very tall for her age. She was ordered Valerian + Ammonia, a plunge bath daily, and brandy 3 oz. In the course of the next fortnight she became much worse, quite helpless; when taken out of bed to be weighed her limbs gave way and she collapsed into an animated heap. Her weight on May 29th was 51 lbs.; her total urine for 24 hours = 16 oz., sp. gr. 1032, depositing uric acid largely; the total urea was 419 grains; total phosphoric acid = 27·44 grains. June 5th.—She was in same state; lay in bed like a statue; almost voiceless, and vacant looking. When she tried to speak she made no sound at first, but afterwards was able to make herself heard. It was a strange sight this fair, large-eyed girl, lying there day after day so unnaturally still and silent. In her former attack she was in the same semi-paralytic condition, but was emotionally excitable. Her urine at this date was acid, total quantity 14 oz., sp. gr. 1025; total urea = 210 grains; total phosphoric acid = 21·5 grains. She was ordered 3 days later Strychniæ gr. $\frac{1}{20}$ + Acid. Nitric. ♏j + Spt. Æth. Chlor. ♏x + Aq. ℥j, *ter die;* and a few days later Citrate of Iron and Quinine was added to the Strychnia, and the frequency of the dose was increased, as well as afterwards its amount, so that by July 14th she was taking gr. $\frac{5}{16}$ in the day; at this date she had improved materially, was able to walk by herself. On July 31st, when she was almost quite well, her total urine in 24 hours was 24 oz., sp. gr. 1015, pale; the total urea was 185 grains. Her weight on Aug. 5th was 55½ lbs. Aug. 7th.—Discharged well. The urea amount during the height of the disorder was 8·2 grains per lb. of bodily weight; when she was quite convalescent it was about 3·4 grains, a diminution of more than a half. There can be no doubt that the Phosphoric acid was similarly diminished, though unfortunately the analysis was omitted. At the same time the second analysis shows that a large urea excretion is not constant during the height of the malady, for on June 5th the urea amount was 4·1 grains per lb. The urine of June 26th deposited a thick sediment of amorphous phosphates. In this case also there is no trace of rheumatism.

Case 14.—W. C—, æt. 16, admitted June 5th, 1869, having been discharged May 8th convalescent from acute rheumatism, but with a mitral murmur. Chorea came on 9 days before admission; his speech was much affected. He did not improve with Bromide of Potassium, subcutaneous opiate injection, or nitrate of silver; but as soon as I gave him Liq. ferri Muriatis ♏xv, 2dis horis, he began to mend, improved rapidly, gained in the last 14 days 6 lbs. in weight, and was discharged July 17th, the murmur being then very slight, and I am much disposed to think not organic. The urine had presented much the same characters and variations as in the first two cases. June 19th its sp. gr. was 1038, and it deposited lithates copiously. On the 23rd it was alkaline, sp. gr. 1026, and deposited phosphates abundantly, prisms and amorphous matter. There can be no question that in this instance energetic 'ironing' cured the disease.

Case 15.—E. H—, æt. 8, female, admitted July 16th, 1869, ailing about 3 weeks with chorea, which is not severe; she can walk a little. Has never had rheumatic fever. Sounds of heart loud and distinct, first prolonged at apex and left side; no bruit. Pulse very weak. 19th.—Urine = 16 oz. in 24 hours, sp. gr. = 1035; total urea = 468 grains; weight = 44½ lbs. Bromide of Potassium gr. x quater die was given, but she got worse, was unable to feed herself. After a week Strychnia gr. $\frac{1}{20}$, *quater vel quinquies in die*, was substituted, but on Aug. 4th she was very statuesque, lay still and silent all day long, could not feed herself or stand in bed. Aug. 6th.—She passed an Ascaris lumbricoides about 12 inches long, and was able that day to walk a little alone. Santonine was given, but no more worms came away, and as the Strychnia produced some rigidity it was omitted, and Liq. ferri Muriatis ♏xv + Spt. Æth. Chl. ♏v + Aq. ℥j, 3tiis horis, was ordered. Aug. 14th.—There was scarce any trace of chorea; she gave her hands when asked, and walked quite steadily and well, but she seemed languid and talked very little. She went out well Aug. 21st. The urea amount in this girl was 10·5 grains per lb. of bodily weight, which is certainly excessive, though, unfortunately, the controlling analysis during convalescence was omitted.

The chief cause of the chorea in this case, I believe, was the intestinal parasite; improvement ensued as soon as it was ejected. At the same time I feel that her nervous system, and that of all the other 3 cases, was far from being in a satisfactory robust state, and I have no doubt that exposure to unfavorable influences would be very likely to reproduce the disease. A choreic child ought not to live in London. I hope, as opportunity offers, to continue the examination of the urine in cases of chorea. At present it seems to me that the azoturia of the choreic is to be regarded much in the same light as that of the adult who suffers with a great variety of sensory disorders, as will be more particularly noticed under the head of neuroses of the urinary organs. In both prostration of nerve power and excessive renal secretion are prominent phenomena. It may help the failing faith of some half sceptics in the virtue of medicine if I subjoin the following observation made on a child who was spare and rather weakly, but fairly well fed :

His weight was 57 lbs.; his 24 hours' urine, collected 2 or 3 days later, was 24½ oz., weakly acid, sp. gr. 1033; total urea = 611 grains; total phosphoric acid = 29·8 grains. From June 10th to June 30th he took Strychniæ gr. $\frac{1}{40}$ + Liq. ferri Muriat. ♏x, *bis die.* At the latter date the total urine was 16 oz., quite clear and palish, sp. gr. 1025; total urea = 276 grains; total phosphoric acid = 20·88 grains. His weight on July 2nd was 58½ lbs. He was more vigorous. Here the urea amount *before* medication was 10·7 grains per lb. of bodily weight, and the phosphoric acid amount ·52 grain. After medication the urea amount was 4·8 grains, and the phosphoric acid ·36 grain; the gain in weight was 1½ lb. The circumstances were in all respects the same at the date of both analyses.

CHOREA ELECTRICA.

The malady so designated is of comparatively recent origin, and has hitherto prevailed almost exclusively in the districts of Milan and Pavia. Dubini first described it in 1846; Morganti saw the first real cases of the disorder in the province of Pavia in December, 1851. In the succeeding 20 months they multiplied so fast that 39 were admitted into the men's wing alone of the hospital. The great majority seem to have been healthy country people, well made, sound in mind and body, and living a quiet life. Dr. Frua states that females are much more often affected than males, especially those in whom the menstrual function is about ceasing. No age is exempt, but the chief liability was from 14th to 30th year of life. The illness commences with transitory weariness and depression, followed by partial muscular contractions, with numbness in the parts affected and dulling of the tactile sensibility; the health is otherwise perfect. The above-mentioned symptoms sometimes ceased after their first appearance completely for days or months, and then returned with fresh severity and proved fatal. Morganti distinguishes three principal forms of the malady—the cerebral, the spinal, and the typhous; the second is the most striking and the most frequent. It resembles ordinary chorea, and is characterised by rhythmical jerks of the limbs on one or both sides of the body.

Pignacca also makes 3 groups of the cases—his first, which he designates pure electric chorea, seems to be the same as Morganti's spinal; his second group he terms epileptic, because in the place of convulsions attacks of true eclampsia with loss of consciousness occur; his third form, the cerebral, has much resemblance with Meningitis or Encephalitis, and is characterised by violent headache, frequent vomiting, loss of consciousness, delirium, sopor, and fever. The features of the disorder, as described by Dubini, are—(1) Muscular spasms, succeeding each other at longer or shorter intervals, much like the twitchings produced by electrical currents. (2) Diffusion of these spasms, which begin in one limb, over the whole body in the course of a few days. (3) Violent contractures of the affected limbs, occurring twice or thrice a day. (4) Paralysis following the convulsions. (5) A high mortality, 94 per cent. (6) Absence of visible pathological alterations. (7) Exemption of all but country folk from the malady. Pignacca says the disease is rare; he met with only 40 cases in 6 years. His cerebral form commences for the most part suddenly, when the patient is in excellent health. Headache is generally the first symptom, followed by giddiness, loss of perception and consciousness, falling down, and vomiting. Delirium, rarely violent, ensues about the 4th to the 6th day, and is followed by stupor and somnolence. In the lucid intervals the patients are quiet, and can often recognise their relations. At the same time as the delirium clonic convulsions appear, which affect more or less of the body, and occur rhythmically with short intervals. The head is hot, the eyes injected and brilliant, the pupils normal or dilated, the tongue dry and red, the pulse 116 to 130; thirst is great. Towards the 6th to the 8th day of the disease the delirium and convulsions are unremitting, the pulse is small and extremely weak, there is copious sweating and sopor, great depression, and from the 10th to the 16th day the patient dies.

Dissection reveals no determinate lesions. There is generally much venous congestion of the encephalon and its membranes and of the spinal cord. The convolutions of the hemispheres may be flattened, the consistence of the brain normal or increased; the thoracic organs are normal, the blood in the veins tarry, sticky, gritty; the solitary follicles and Peyer's patches are enlarged, and the latter sometimes ulcerated, the mesenteric glands enlarged, the spleen swollen and fragile. These latter statements go far to justify the view taken by Frua, that this form of the disease is typhus (or typhoid) with convulsions. This view, however, can hardly apply to the pure or spinal El. Ch., which Dubini defines as an acute disease, rarely attended with fever, nor, I should think, to the epileptic.

Nothing is yet known with certainty as to the *causation.* Season seems to have no notable influence, nor could it be ascertained that there was anything injurious in the diet of those who were attacked, except that the water was bad. Pregnancy and suckling afforded no immunity. The description given of the locality is very suggestive of malaria; it is said to be very damp, subject to inundations, and traversed by many canals. The prognosis is very unfavorable, the great majority of the patients died, the larger number in the course of the first month.

Antiphlogistic *treatment* did more harm than good. Scottini reports 3 cases of recovery under chloroform inhalation and friction on the spine. Stimulants and tonics are spoken of favorably. The following case reported by Secondi may serve as an illustration of the disease, and of the treatment which he thinks should be tried.

Case 1.—A workman, æt. 32, resident in Lombardy, injured his left knee. After the wound was healed twitchings came on in the left thigh, which became gradually stronger and more frequent, so that when he was seen they occurred 38 times in the minute. The patient had lost the use of the limb, and complained of formication in it. In spite of V.S., sedatives including chloroform inhalations, and purges, the twitchings increased, extended to the left arm, and deprived the patient of sleep. On the 12th day of the malady an epileptiform attack occurred, which returned several times a day in spite of C. C. and leeches; so that after some days ice was applied to the head on account of the brain having become affected. On the 17th day wet packing was resorted to morning and evening for 10 days, during which time the epileptic paroxysms gradually became fewer and milder. The left leg remained for a considerable time paretic, so that crutches were necessary.

Case 2.—A case which occurred under Dr. Parkes' care, in the U. C. H. Hospital, and is recorded in the 'Lancet,' 1861, vol. i, p. 214, bears a good deal of resemblance to electric chorea. In this the disease commenced with violent quivering and tetanic convulsions of the right arm alone, the fingers being flexed and extended spasmodically. The patient lost consciousness for a few minutes only on one occasion. Sometimes there was loss of sensibility in the right arm during the spasmodic movements, and once there was a tendency to twitching of the left arm and hand. Headache and giddiness were prominent features. He suffered 6 years before from intermittent fever for 20 weeks, and had then and subsequently attacks of congestion of the brain. He had had syphilis, and his mother had fits, probably epileptic; the attacks lasted 10 to 30 minutes, the fourth was so severe that he said if it lasted an hour it would kill him. On the first day he had 3 attacks, on the second 10; after this they ceased, and 8 days after admission he was discharged well. Treatment consisted of a V.S. to the verge of syncope, purgation, and morphia. The bowels were torpid, but when two copious stools were obtained by a turpentine enema the symptoms were greatly relieved, and the sense of weight and fulness in the head alleviated. After the bowels had been again well moved by croton oil, morphia seems to have been beneficial.

It is difficult to come to a definite conclusion relative to Chorea Electr., if, indeed, it be right to group all the cases together under one head. The malady seems to have been new to the observers, to have been epidemic, unusually fatal, and to have occurred under circumstances which look like the introduction of some specific miasm like that of typhoid. Yet the more common forms of the malady are very unlike those of any fever, and rather accord with the conception of a malarial tetanus or epilepsy. All that can be said at present is that the occurrences related furnish us with a fresh example how multiform and varying are the forms which disease may assume, and how little we in our short day have a right to assume that we are acquainted with all the ways to death that ever have been or will be.

CHAPTER XVIII.

PARALYSIS AGITANS.

It appears to me a question whether two distinct affections are not often comprehended under this name. For, on the one hand, it appears pretty certain that there is one form which is met with in old persons, is quite incurable, and is associated with, if not dependent on, organic wasting changes in the nervous centres; while another form occurs in younger persons, is more curable, and therefore is presumably not dependent on organic change. Stoffella[1] relates the case of a man, æt. 79, who had the affection five years before his death. At the autopsy he found traces of atrophy of the brain, with secondary dropsy of the ventricles and of the cerebral membranes, and an apoplectic cyst as large as a pea in the right optic thalamus; the pons Varolii and medulla oblongata were remarkably stiff, the arteries at the base calcareous, and the lateral columns of the cord, especially in the lumbar region, traversed by greyish opaque streaks, which, as well as the indurations in the pons and medulla, resulted from embryonal connective tissue. Cohn, who has recently published a paper founded on an experience of six cases, gives two autopsies,[2] in one of which there was marked cerebral atrophy, and in the other wasting of the cord opposite the second cervical vertebra. The ages of the patients, both males, were 49 and 74 years. The first had been employed in using mercury. Skoda[3] details the autopsy of a female, æt. 34, who had been affected about $2\frac{1}{3}$ years, and died of variola. The brain was tough, the pia mater œdematous, the walls of the ventricles, the fornix, pons Varolii, medulla oblongata, and cord, were remarkably stiff, both optic nerves were flattened and stiff. In some opaque reddish spots in the brain the nerve-tissue was destroyed by embryonal connective tissue, which occasioned also the induration of the pons and medulla. The muscles were very fatty, the neurilemma of the nerves of the upper limbs was thickened.

---

[1] Schmidt's 'Jahrb.,' vol. cxiii, p. 39.

[2] Ibid., vol. cviii, p. 303.

[3] Ibid., vol. cxix, p. 294.

The following histories may serve as examples of the more curable forms of the disease. A male, æt. 57, came under Dr. R. Reynolds's[1] care suffering with vertigo and general disturbance, with paralytic tremor of the whole right upper limb, which, in the situation of the biceps, was 4° F. hotter than the other. The sensibility was unaffected. After five applications of a 120-link Pulvermacher's chain, each lasting an hour, the spontaneous jactitation completely ceased. By continuing the same treatment every other day the power of the arm was almost quite restored in a month. The disease was recent, having commenced only fifteen days before he was submitted to treatment. Graves gives the case of a female, æt. 25, who after a severe fright became vertiginous and hemiplegic, and was laid up in bed three months. The hemiplegia gradually declined, but the muscular power remained weak, and very imperfectly under voluntary control, most of the muscles being in a state of perpetual motion. Amaurosis also affected both eyes during the disease, but one recovered completely, the other very imperfectly. She could not walk slowly, and when she had commenced walking she could not stop without considerable difficulty. The following cases have come under my observation at St. Mary's, the two latter being under my own care.

Case 1.—S. M—, female, æt. 12, admitted April 3rd. Of healthy aspect. Ill three months with catarrh and cough, last three weeks has had vomiting, which has got worse. She rejects everything which she takes shortly after swallowing it, but has no pain in the stomach. Slight epigastric tenderness. Bowels costive. Tongue whitish. Much thirst. Pulse 70. Appetite good. Her right arm is in continual vibration ever since her illness commenced. Lung and heart sounds healthy. 4th.—I found her asleep to-day and her arm quiet. She had two purges of calomel and haust. sennæ. On 6th she was electro-magnetized for about ten minutes, and in about one hour after the arm became quiet, and has remained so ever since, and the vomiting also has ceased. 13th.—Discharged.

Case 2.—J. K—, labourer, æt. 60, admitted March 16th. A broad-made, strong-looking man, not anæmic. Had rheumatic fever seven years ago, not so well since. Thirty years ago he was frightened by a bull who tossed him into a hedge, and he has shook ever since. His hands and arms tremble, his hands shake so that I cannot feel his pulse. He has pretty good muscular power in his arms. He does not seem to have been intemperate. He only attended a short time on account of some lumbar rheumatism.

---

[1] 'Lancet,' Dec. 3rd, 1859.

Case 3.—J. H—, æt. 47, labourer, admitted September 24th. Is a large man. Complains of tremor of the right upper extremity; the muscles of this limb have full power, but quiver and twitch constantly except while he is quiet, as in bed; the pectoral muscles of that side are involved. There is some tremor of the legs, but nothing like that of the arms. Both, however, are decidedly weak; the knees are sometimes very stiff. No numbness of the right arm, but has pins-and-needles sensations in hand sometimes. When the shaking stops he has aching in the right scapula, and along the biceps. No pain or tenderness in the spine. When first attacked his eyes were always "winking," not lately. Sight and hearing are quite good now, but his speech, memory, and vision, are occasionally impaired. The least excitement makes him worse. He sleeps, eats, and drinks well. Sweats very easily, much at night. Was affected in the same way two years ago, was under my care, and soon got well, remained quite well for one year, then the disorder came on again at intervals, some days he would have it and others not. I gave him at first strychnia, iron and ether, and faradised his arm. This treatment, especially the electricity, was rather injurious than otherwise. I changed it after eight days for tr. hyoscyami ʒss *ter die*, under which he rapidly improved, and ceased attendance in fortnight.

Dr. Sanders has recorded an interesting case which bears a good deal of resemblance to the preceding (v. 'Edin. Med. Jour.,' 1865, May). The subject was a fairly robust labourer, about 35 years old, who had sustained fracture of the leg, and injury to the knee, head, and dorsal region of the spine in a fall some months previously. He recovered from these damages, and went to work, no disorder of movements having made its appearance. A few days after returning to his work he again fell, and, although not injured, appeared to sustain a great fright. He immediately began to shake so violently that those who saw him thought him to be in a fit. These shaking movements have since continued. When the patient is kept perfectly quiet, as during the night, nothing is noticeable. If caused to move, or in any way agitated, the most violent oscillating and somewhat rhythmical movements of nearly all the muscles of the body, with the exception of those of the face, take place. If the patient attempts to walk these movements are so excessively violent that he nearly falls, and when he reaches a seat he can only with difficulty maintain himself in a sitting posture. There is no paralysis of voluntary movements, no loss of muscular power, none of the sensory functions are in the least degree implicated. There is no tenderness over the spine, no affection of the heart. The patient had suffered from ague and rheumatism many years before. Dr. Sanders concluded that the case was one of functional disease of the spinal cord, allied to chorea, but differing from it in the movements being rhythmical and not irregular, and in the muscles of expression being free from disorderly movements. (2) The disorder differs from paralysis agitans in the absence of muscular palsy; it may be termed "dysteria agitans." (3) In the form and the extent presented in this case it is a rare affection, as existing independently of old age, mercurial poisoning, great debility, or organic disease of the cerebro-spinal axis. (4) It probably depends on a weak and excitable condition of the motor centres of the cord, due to anæmia of its grey substance.

Petræus[1] relates two severe cases, observed in the Copenhagen Hospital, one of which proved fatal. Nothing was found at the autopsy but fatty degeneration of the heart, and pneumonic consolidation of the right lung. He remarks on the tremor not being constant in many cases, ceasing for some days, and then recurring with fresh force, or changing its seat from one part to another. The tendency to steady increase is, he thinks, specially characteristic of the disease. All weakening influences, whether of mind or body, are apt to produce the disorder. Cohn distinguishes tremor from paralysis agitans. He considers the first as paretic debility and not as a spasm; and derives it from failure of the tone of the voluntary muscles which they receive from the nervous system. The causes of spasm and of tremor are the same. Paralysis agitans he considers as tremor complicated with palsy, the latter involving even the muscles concerned in swallowing, and the sphincters, and being attended with anæsthesia. The paralysis generally supervenes at an advanced period of the disease, and is usually less extensive than the tremor. Both Cohn and Copland consider mercurial tremor as an example of paralysis agitans. Frank[2] relates the case of a widow, æt. 40, who, after exposure to cold on coming out of a vapour-bath, was attacked with this disorder. The movements

---

[1] Schmidt's 'Jahrb.,' vol. cxvii, p. 163.

[2] Copland's 'Dict.,' art. Paralysis, p. 25.

LEEDS SCHOOL OF MEDICINE

seem, however, to have been more active than usual, and as she recovered in no long time after cupping the spine it may be doubted how far the case is comparable to the chronic affection.

It appears to me that the cases I have cited warrant the view that there exists a functional nervous affection which at least bears a very close resemblance to paralysis agitans. Between this state and chorea there is certainly no very material difference. From the success of the continuous galvanic current in Reynolds' case, and of henbane in my own, especially after faradisation and strychnine had failed, it seems probable that the disorder depends, in some instances at least, on increased excitability of the nervous centres of such a quality that it will not tolerate tonics, and requires rather calmants. This varying quality of nervous matter is just one principal thing that makes the treatment of epilepsy and its allied disorders so uncertain and difficult. Whether the slighter forms of the affection may pass by long continuance into the graver and more incurable, attended with organic change, is difficult to determine, but I think it quite possible. The analogy of chorea which as we have seen is complicated sometimes with decided morbid changes is very confirmative of this view. Prolonged restless excitement of the nervous tissue in the centres is very likely, as in epilepsy, to induce a local determination of blood which gives rise to slow exudation and induration. It is somewhat remarkable that these changes affect the same localities in paralysis agitans as they do in epilepsy. The wide difference between the irregular purposeless tremors of paralysis agitans and the strong steady contraction of a muscle in voluntary effort needs no exposition. It is clear that no theory can be correct which would class them together, because in both there is muscular action. The one circumstance common to both is that *some* disturbance of the molecular state which the nerve-cells assume during quiescence occurs in each. In the one this disturbance is perpetual except during sleep, owing probably to deranged nutrition of the nerve-cells. In the other the disturbance is regulated by the will, and is compensated by sufficient repose. The tendency of a habit of action, as well insisted on by my friend Dr. Sieveking, to perpetuate itself and become inveterate is not to be left out of account. The tremor, which at first excited by some casual cause might by appropriate means have been stilled permanently, when allowed to become habitual exceeds our power to control. The treatment of paralysis agitans in its earlier stages must, I think, be substantially the same as that of chorea. In its later, though there can be small hope of benefiting the patient materially, I should use hydr. bichlorid. in tr. cinchon. with ol. morrh., and sulphuret of potassium baths.

As mercurial tremor has been alluded to above as a species of paralysis agitans, a view in which I quite coincide, I will observe here that mercury may be regarded with good reason as a very poison to feeble nervous systems. Copland says, "Of the origin of hypochondriasis in an improper recourse to calomel I have seen several instances" (Art. 'Hypochondr.,' p. 264). The disorder of the motor nerves which it produces is essentially a choreic affection, as evidenced by the similarity of the symptoms, the existing debility, the "lædentia," and the "juvantia." Dr. Watson writes that it is aggravated by all kinds of mental emotion, and relieved temporarily by anything that tends to stimulate and fortify the nervous power. Steel is one of the best remedies for this disorder, as it is for chorea and other neuroses. The inflammation of the buccal mucous membrane induced by mercury is evidently not of phlegmonous character, but of diffuse, and quasi-erysipelatous. It may be referred I think very reasonably to a paralysis of the vaso-motor nerves of the part. Eczema mercuriale is a similar affection of the skin, it is apt to be attended with adynamic fever, and sometimes with delirium and convulsions. The practice of taking or giving frequent blue-pill aperients is worthy of all reprobation.

CHAPTER XIX.

SPASMODIC AFFECTIONS.

HYPERCINESES, as Romberg terms them, seem to be of rarer occurrence than the corresponding hyperæsthesiæ. The same may be said of the kindred paralyses as compared to anæsthesiæ and neuralgiæ. This is somewhat remarkable inasmuch as in organic disease the relation is reversed, motor power is much more frequently impaired than sensory. In many cases spasms depend on some organic alteration, but in quite as many they are independent of it. They present two principal forms, viz. clonic and tonic; the latter are more often the result of sthenic excitement than the former. In some instances the emotional centres are the seat of morbid excitability, in others the spinal. Often the excitability is intimately connected with debility, but this is by no means necessarily the case. Remote irritation, in the intestines or elsewhere, is a frequent determining cause of the spasm. Though we cannot accurately describe the alteration in the motor centres which conditionates spasm we can discern in it, I think, these features—(1) exaggerated activity of the inferior centres, the secondary or tertiary; (2) loss of controlling power in the superior; (3) a varying quality of disorder in the affected centres, which we distinguish by the terms *tonic*, *clonic*, applied to the muscular contraction—of these there are various grades; (4) a tendency to paralysis. The exaggerated activity is altogether wasteful and useless if not injurious to the economy; it is not the result of an increase of capacity for healthy exertion, but a spendthrift abuse of that which exists. We may form some idea of the degree of this mischievous activity by comparing a powerful voluntary action with a spasm. In the former the chief energy comes from the hemispheres with their myriad nerve-cells—it is the intensity of the volitional impulse that determines the intensity of the effort; but in spasm the far smaller inferior motor centre altogether overpowers the higher. It could not surprise us if such excessive and abnormal action of the nerve-cells caused their exhaustion, and if thus paralysis was a frequent sequel of spasm. There is, however, more in the matter than this—there is no doubt that the *kind* of morbid change which produces spasm is also very prone under slight variations to give rise to paralysis; this is more apt to occur in clonic spasm than in tonic. Spasm and its modifications seem to me to afford much ground for believing that the nervous centres *per se* may assume different morbid states. I cannot think that changes in the blood-flow can explain these manifold varieties of morbid action.

Romberg in his first volume has given one of the best accounts we possess of the different manifestations of spasm. I shall notice briefly in this place the less commonly recognised forms, having remarked on the classical elsewhere.

Trismus is a clonic or tonic spasm of the muscles concerned in the movements of the lower jaw, and sometimes of the adjacent. It may be produced in predisposed persons by cold. One of Romberg's patients, a male, æt. 43, is subject to a *dying away* in a marked degree of the upper and lower extremities, accompanied by numbness of the muscles. At the same time the masseters and the tongue become rigid, and there is dysphagia. These symptoms are brought on immediately by exposure to cold. Evidently spasmodic contraction of the arteries of the limbs coincides in this instance with a like state of the masticatory and lingual muscles. Various other causes may produce trismus, as dental and intestinal irritation, epilepsy, the gouty diathesis, abscess in the abdominal parietes, and hyper-excitability of the nervous centres. Dr. Fraser relates a case of severe trismus resulting from exposure to wet and cold, which was treated beneficially with Cannabis Indica given in gradually increased doses up to gr. iij, *o.h.* He improved gradually and made a good recovery (v. 'Med. T. and Gaz.,' Feb. 7th, 1864).

Facial spasm may show itself in one or several of the muscles supplied by the seventh nerve. It may affect the orbicularis palpebrarum alone, or the buccinator. A patient under my care suffering with periodic frontal neuralgia, attended with giddiness, had also twitching of the left eyelids. The pain and giddiness were cured by iron + quinine, but not the twitching, nor was the endemic application of morphia more effectual. A lady, who had had chorea when a girl, and whose nervous power was weak and overtasked, suffered with twitching of the face, her mouth being frequently drawn awry so that she had to hold it with her hand to steady it. She was wonderfully better in frosty weather. Immediately on eating her face and neck became quite flushed and crimson. Here we have a paresis of arteries associated with a clonic spasm of adjacent muscles, the vaso-motor and musculo-motor nerves being no doubt in a like state. The following case was under my care:

Case 1.—S. T—, æt. 29, nurse, admitted Feb. 19th, 1869. For last 2 years has suffered from throbbing in the head and eyes, with temporary dimness of sight, these symptoms being usually worse at the catamenial periods. She complains of loss of power and of crampy feelings in the toes of the right foot, and feels generally weak. Liq. Arsenicalis ♏iij + Dec. Cinchon. ℥j, *ter die*, was ordered, and by the 27th the cramps were much better; but another symptom had appeared, viz. closure of the eyelids, the left being more completely closed than the right. This lasted about 15 minutes, but on former occasions it had continued an hour. She described the attacks as commencing with spasmodic twitching of the lids, which at last close as if they were screwed up, and prevent her seeing at all; the closure is so forcible that she cannot raise the upper lid with her finger. Another trouble she had was that the right arm at times became very weak, felt quite a burden to her. Sometimes she can hardly write, and after she has written awhile her hand gets more unsteady. She seemed to be a quite calm-tempered person, in nowise hysterical, and ascribed her disorders to having had very disturbed nights while she was nursemaid for 5 years in a house where there were many children. She was obliged at last to leave on this account. Valerianate of Zinc and Indian hemp were ordered, but she did not remain long under my hands. Here the dependence of spasm on failure of nerve-power seems clearly evidenced.

V. Gräfe relates the occurrence of facial spasm in a patient, which affected both eyelids especially, and almost deprived him of the power of walking alone. There were no spontaneous pains nor points painful on pressure in the course of the fifth pair. If, however, pressure was made on the glosso-palatine arch on the left lower jaw, the spasm immediately ceased, and the patient could open his eyes. At the same spot there was found a putrid ulcer which probably acted as a cause of irritation on the gustatory nerve. This was cured by simple treatment, and with it the spasm speedily got well (Schmidt's 'Jahrb.,' vol. 127, p. 301). The spasm in this case was evidently of reflex origin.

Mitchell[1] records the case of a female, æt. 50, in whom the muscles of the face and tongue and neck on the left side were affected at intervals of ten minutes with rigid spasm lasting for three minutes at a time. The left side of the nose and chin was numb, the teeth were closely compressed, the nose was drawn over to the left side, and the forehead and eyebrows corrugated. The muscles of the neck rotated the head to the left shoulder, the left arm became extended and a sense of numbness ran down in a straight line from the neck to the thumb and forefinger. The disorder ceased after the extraction of all the carious teeth. Romberg had under his care a robust man, æt. 36, who after a powerful mental emotion was attacked with slight paralysis of the left side. This disappeared after bloodletting and purging, but violent spasm set in affecting exclusively the left half of the mouth and the platysma myoides; it persisted for four days and nights and gradually yielded to cupping and tartar emetic, and the endermic application of morphia. Oppolzer[1] relates a case in which, along with pain of the right side of the head and face and right shoulder, twitchings occurred in the facial muscles, the sterno-cleido-mastoid, the muscles of the external ear, and those of the shoulder. The muscles of both external ears were affected, the right most. The twitchings were attended with severe pain which preceded and outlasted them. Pressure on any part of the face, or head, or shoulder, arrested the twitchings, but not the pains. Volition also controlled the spasms. In the preceding cases we have examples of the causation of facial spasm by simple nervous hyperæsthesia, by remote irritation, or by sthenic excitement of the brain (probably). It is evident that much discrimination is requisite to judge correctly of the pathological state.

---

[1] 'Med.-Chir. Trans.,' vol. iv, p. 25.

Strabismus is sometimes a spasmodic affection, and may be produced by dental or intestinal irritation, by inflammatory disorder at the base of the brain, and by any emotions which temporarily derange mental equanimity. Böhm states that idiots whose eyes were in a normal state at other times squinted egregiously while engaged at their lessons. As the cerebral power increases the squint lessens and disappears. This seems to indicate a diversion of *vis nervosa* from the centres of the ocular nerves to the weak and struggling hemispheres. The same author relates an interesting instance of the replacement of ague paroxysms by spasmodic strabismus. The type was at first quartan, then tertian, and lastly quotidian. Sir

---

[1] 'Wien. Wochenbl.,' 6—8, 1861.

E. Home relates the case of a man who, after a fatiguing day's shooting, saw suddenly everything double; the two eyes did not look directly to an object. Rest relieved the disorder, and dinner with wine, but it was made worse by living low, mercury, leeching and blistering. It gradually went off in about a year. This strabismus was probably paralytic. ('Mackenzie on the Eye,' p. 344.)

The muscles of the neck are not unfrequently affected with spasm which is often produced by rheumatoid influences, but in other cases, as in that related by Brodie, where a wry-neck alternated with melancholia, seems to depend on dynamic nervous derangement. In one of Romberg's cases dentition was evidently the cause of the spasm. In a weakly girl, æt. 7, under my care, there was very marked tonic contraction of the left sterno-cleido-mastoid. The head was drawn to the left, much more so at some times than at others. Under the use of iron, ether, and valerian with veratria ointment locally the spasm ceased, recurred again with earache, and ceased again under the administration of pot. iod. + ammon. carb. There was a rheumatic element in the case as evidenced by some affection of the feet.

The three following cases are instances of spasms probably originating in the upper cervical region of the cord, of very obscure causation, but affording (at least two of them) encouragement to persevering treatment.

Case 2.—E. B—, æt. 43, seen October 3rd, 1862. Has been affected for about twelve months as at present, his health, however, remaining good. Is a broad-made man with rather short neck, works at china riveting, and thinks his work may have something to do with the disorder, as he sits with the right side of his head facing a window, and has to turn frequently to the left. He is subject to almost continual clonic spasm especially of the left sterno-cleido-mastoid and trapezius muscles, by which the head is bowed to the left side and the shoulder is raised. Any mental excitement increases the spasm greatly. He is much worse sometimes than at others. He has a sensation of cramp in the left neck which extends down the outer side of the same arm, and is relieved by stretching it out. The muscles of the right side of the neck do not appear to be paralysed; he can straighten his neck occasionally by a voluntary effort. In June, 1863, he had an attack of rheumatism of the right leg. April 5th, 1864.—Is much better since he went down to Brighton last autumn, and had sea-bathing; while in the water he was quite free from spasm, and so he is now in the morning and when he is warm, but on cold, wet and foggy days he is worse. The spasm is very much less than it used to be. Much treatment was employed in this case with but little advantage; he took ferri carb., zinci valerian., tr. aconiti, pot. iod., and citrate of quinine and iron, but with very little advantage. Subcutaneous injections of atropine and opium were fairly tried, but they disappointed my expectations. Galvanising was apparently of benefit, the antagonist muscles being faradised, and the affected ones subjected to a continuous current. This was done under Mr. Lobb's supervision. On the whole I think the "vis medicatrix" had as much share in the improvement as the remedies. The affection seems to be specially referable to excitement of the left spinal accessory nerve, but there is nothing to show how this originated. May not such states of excitement arise in nervous centres apparently *suâ sponte*, just as they seem to do in centric epilepsy?

The following is an instance of very similar disorder, but was more amenable to remedies.

Case 3.—A gentleman, æt. 53, in good flesh, consulted me in August, 1867. He had long been liable to cold feet, and flushing of the head, was not gouty or rheumatic, but his residence was very damp. His general health was good. No chorea or fits had occurred in early life. He slept well. His pulse was not notably weak or frequent. His ailment had been coming on the last two months, and had got worse the last 3 weeks. It consisted in a convulsive contraction of the muscles of the left side of the neck and left shoulder. The head was drawn down to the left, the face turned toward the right shoulder, and the left elevated. When it was supported the head remained quite still, and the muscular contraction could be controlled without much effort. Any slight exertion, however, brought on the spasm, walking, riding, eating, writing, and even reading. He found at one time that his vision was interfered with, so that he could not direct his fork while eating. This was probably from extension of the spasm to the muscles of the globes. The urine deposited abundance of fine oxalates. Bromide of Potassium was given at first, but had no good effect. Application of the continuous current was of no avail in quieting the spasm, nor was a morphia-dressed blister. Quinine in gr. v doses with nitric acid was next given *ter vel quater die*, and Extr. Belladonnæ, gr. $\frac{1}{3}$ as often. He also went into the country, where he began to improve. By November he had gained so much as to be able to write some time without having his head held, which before was impracticable. Valerianate of Zinc was now added to the Belladonna pill. By March, 1868, the spasm was much less, scarcely occurred except when he was walking. He was, however, unusually drowsy, 9 hours' sleep did not suffice. The quinine had been omitted, and he was taking the Valerianate and Cod-liver oil. In May he was able to walk with his head quite straight until he had gone about 2 miles. The only probable cause I could find for the disorder was over-exertion of mind and body. The effect of expenditure of nerve-force in bringing on the spasm was strikingly apparent, and herein, as well as in the general debility, the relation of spasm to paralysis is evident. The drowsiness must also be regarded as another indication of nerve weakness.

Case 4.—S. W—, æt. 33, female, seen November 14th. Aspect "spirituel." Has suffered a long time with indigestion, does not often vomit. Feels sinking in fifteen minutes after food as if she had not taken any; this is relieved by spt. ammon. fœtid. Is not anæmic. Bowels very costive. Pulse above 100. Urine clear. Catamenia regular. She suffers with attacks of vibratory movements of head, sometimes of arms, which are made worse by the shower-bath. At times has paroxysms of violent spasmodic contractions of the diaphragm resembling hiccup attended with constant expectoration of white frothy mucus. I witnessed one of these, which lasted some minutes and appeared very distressing. They continued sometimes a quarter of an hour and were succeeded by sensations of sinking. The vibratory movements of the head from side to side were much more continuous than the spasms of the diaphragm; they occurred sometimes while she was lying down. There were sometimes intervals of four to eight days between the paroxysms. During one fortnight they occurred very frequently; she could not take anything, even water, without bringing them on. Her nights were restless. She had sometimes pain and throbbing in head. She could not walk without some slight assistance, as a finger held out to her. Her disorder did not seem to be at all simulated; in fact, both the cervical and the diaphragmatic spasms were clearly involuntary. She remained under observation till towards the end of the succeeding March, and was then dismissed materially improved, she could walk a good deal better. The chief remedies employed were aperients, citrate of iron and quinine, and iron electuary. The pulse varied from 108 to 132. It seems most probable that this was a dynamic disorder, and also that it was not dependent on remote irritation. Had it been otherwise the progress would rather have been to worse than better. I think we must assume the existence of a state of erethysm of the cord in the vicinity of the origin of the phrenic and upper cervical nerves. Counter-irritation in both these cases would probably have been advantageous, in fact in the latter the head was much quieter some time after a blister to the loins.

Dr. Radcliffe relates a highly interesting case of choreal affection of certain muscles of the neck, by which the head was kept continually turning and bobbing. Hypodermic injection of morphia and atropine, bromide of potassium and morphia were used, but without any advantage. The muscles in the neck, which were the seat of the morbid movements, were very tender in many places, and the movements themselves attended with much pain. The malady had continued for 9 years. The subcutaneous injection of

Liq. Potass. Arsenitis produced very great amelioration, so that in the space of little more than 2 months the patient left the hospital almost well. The dose at first was ℥iij, which was gradually increased up to ℥xiv. When diluted with an equal amount of water very much less local irritation was produced. The only other treatment employed was an occasional dose of morphia on account of sleeplessness, and the movements of the head regulated by a pendulum.

For the following interesting account of an endemic spasmodic neurosis, I am indebted to my friend Mr. J. R. Lynch. I am inclined to think that the same affection occurs in Europe, as the term 'coup de vent' occurs, I believe, in French authors, and is applied to the cognate pathemata, as non-organic facial paralysis.

"A curious phenomenon is not unfrequently met with in the districts of the River La Plata, in South America. It does not appear to be localised to one or either side of the river, but is found throughout all the countries of that latitude.

"It occurs in the following way :—A person engaged in the open air suddenly feels a blow, as if struck by a cudgel, and after a few hours' elapse, a sensation of stiffness, with pain of the part where the blow was received; the stiffness involving the whole of the muscles in the vicinity of the supposed blow. For instance, supposing the neck to be affected, the person suffers in a manner similar to stiff neck.

"This stiffness continues for several days, accompanied with pain on attempting to use the muscles affected. By degrees they relax, and the stiffness and inconvenience disappear. There are no constitutional symptoms referable to it; the effect being entirely local. As far as I can make out, there is no loss of superficial sensibility, but the muscles themselves are rendered very irritable; in fact, they are more affected than the surface.

"The usual remedies are very simple, frictions with stimulating liniments, and a purge; even when left alone the effect soon passes off as readily as if medical treatment was undergone.

"It is supposed to arise from contact with a current of air of limited area. The natives call it "Ayea" (?).

"I will not vouch for the correctness entirely of the name. It is so pronounced, but I am doubtful of the spelling. I have looked in several works in reference to it, but have found no mention anywhere (as yet) about it."

The following case was, I think, closely related to neuralgia or at any rate to neuralgic disorder, judging from the anæsthesia and the "juvantia." It was probably a peripheral neurosis, but is of interest specially as showing the affinity between spasm and paralysis (sensory).

Case 5.—A. N—, æt. 17, got suddenly spasmodic contraction of the flexor muscles of the left hand and forearm a week before she came under Mr. Bryant's care. The health was good, catamenia regular, sensation of the parts perfect. Iron was given, and in three weeks the natural movements of the part were restored; the nerves of sensation, however, now became involved, complete anæsthesia of the whole hand and forearm making its appearance. This condition also disappeared in two months under the same treatment, sensation and motion being at last perfect. (v. 'Med. Times and Gaz.,' June 14th, 1862.)

The following is rather a neat example of the causation and cure of a spasm.

Case 6.—E. M—, æt. 19, had just arrived at the period of convalescence from a moderate scarlatina on September 27th, when it was observed that the left fingers were strongly flexed, and she had great pain on any attempt to extend them. The epidermis was separating in flakes from the fingers, leaving the corium tender and painful, but there was no articular inflammation. The pain was chiefly referred to the palmar surface of the first phalanges. I had the hand placed in warm water, and found that this relieved the pain and relaxed the spasmodic contraction, so that the fingers could be more freely extended. I ordered Bismuth ointment to the tender fingers. Two days later her hands were quite easy, and she could extend the fingers perfectly; the ointment had been of great benefit. Two days later she could use both hands freely. She had had an hysterical attack just before the spasm took place. In this case it is evident that the painful tender state of the skin was the cause of the muscular contraction, irritation of sensory nerves produced and kept up excitement of motion, which subsided as soon as the former was withdrawn. Such reflex spasm is of course not uncommon, but it is not often that its mechanism is so clearly shown.

The affection termed *writer's cramp* seems to depend on undue excitability of the muscles and nerves concerned in writing, such that they are unable to execute the necessary delicate movements, but start off into larger ones. When much engaged in writing during cold weather I have experienced a tendency to it, which makes it needful to write more slowly and steadily in order to keep the muscles under control. There is at such times a sense of fatigue in the hand and wrist, and for some way up the arm. The disorder is I think certainly aggravated by using a pen whose point grates against the paper, as fine pointed steel pens are apt to do, and on the other hand the tendency to it is lessened by using a pen which runs smoothly and easily over the surface. Zuradelli considers that there is primary paralysis of some muscle, and secondary spasm of others, and that various forms of the disorder may occur according to the particular muscles affected. Thielman relates a case of similar disorder occurring in a sempstress. When she attempted to sew, the thumb flew away from the needle, and a burning pain extended up along the outer side of the wrist to the elbow, and if the effort was continued a red streak formed in the same situation. She was cured in twelve days by quinine and opium. Haupt states that other neuroses are not infrequent as complications of writers' cramp. He mentions squinting, stuttering, choreic disorder, laryngeal or pharyngeal spasm, strangury, palpitation of the heart, solar plexus neuralgia, headache, &c. Rheumatism appears to be one of the inducing causes, over-exertion of the muscles concerned, and general impairment of nervous power are also powerfully influential. It is evident that resting the enfeebled part is necessary, and in many cases if not indeed in all, I should strongly advise the patient to discontinue entirely writing with the affected hand, and to accustom himself to use the other. This would not cause much inconvenience after a few weeks' practice. Mr. Solly relates a case which recovered after 14 months' rest of the hand, the left being used instead. Cases taken early recover in a shorter time. Pitha relates a case cured by electricity. Dr. Althaus employs the interrupted current when the disorder appears to be paralytic, but the continuous if it is spasmodic. I have no doubt that the latter remedy is especially indicated in spasms due to sthenic excitement, but where the condition is rather one of hyperæsthesia and debility, the stimulus of the interrupted would be I think more beneficial. It is certain that some spasms are cured by stimuli. Tonic or sedative treatment internally would also be very advisable. In cases where there was any indication of a rheumatic element potass. iod., usually with ammon. carb., should be administered. Tepid douching would probably be beneficial, and local bathing with sulphuret of potassium lotion. A curious variety of spasmodic disorder is that to which Remak gave the name 'Spasmus alternans transversus.' It deserves a brief mention, though I am not aware that any other instance of it has been recorded. The patient was a man, æt. 22. Three years before coming under treatment he fell 15 feet, and though stunned at the time, did not receive any notable injury. On recovery he felt weak, and from that time had been dyspeptic. Two months after undergoing the water cure, the disorder in question appeared. He was attacked while walking every 3 or 4 steps with involuntary elevation of the right arm to the horizontal position, while the forearm was bent, and at the same time the glutæi were convulsed, and the left thigh pulled backwards, so that the step was retarded, and the patient staggered though he did not fall. At first Remak observed a second series of convulsions which arose in the right shoulder and passed into the left foot, but the use of the continuous current caused the right arm to be entirely at rest, while in the left leg and in the glutæi spasm still occurs to some extent, though rarely. The attacks also occur when the patient is sitting, though the disorder of the glutæi is then less apparent. Except the dyspepsia, and a slowness and difficulty of speech, and slight anæsthesia of the right palm the health is good. Rapid improvement was taking place by means of the continuous current. ('Lancet,' April 8th, 1865.) One would be glad to know the causal condition in this instance, whether the disorder could be referred to any remote effects of the falls or to reflex irritation from the stomach. The success of the treatment by galvanism is more in favour of the first of these views.

Spasms of the muscles of the lower limbs, especially of the gastrocnemii are not uncommon, and give rise to various distortions. Remote causes of irritation are probably the most frequent, but in some instances there is centric disorder. It is remarkable that in some cases the weight of the body pressing on the feet against the ground seems to have induced the spasm which was absent in the recumbent posture. This illustrates the reflex production of certain distortions. Bamberger relates the case of a youth, æt. 19, convalescent from pneumonia. As soon as he touched the ground with his feet all the muscles of the lower extremities fell into a state of tetanic rigidity, interrupted by the most violent sudden contractions, which threw the patient upwards, and during their rapid recurrence increased in intensity, so that the patient had to be supported. At the same time the face was flushed and distorted, the pulse accelerated and extremely forcible. The moment that the patient sat or lay down all the movements ceased. If while lying in bed the soles of his feet were pressed, the same phenomena appeared, but with much less intensity. He was cured by sedatives and cold affusion (v. Schmidt's 'Jahrb.,' vol. cii, pp. 23, 24). The congenital development of *pes equinus*, &c., which is not infrequent, stands probably in connection with the greater tendency to reflex action during fœtal life in consequence of the imperfect control exercised by the brain.

The following is a good example of the benefit which may be produced by subcutaneous injection of atropia in cases of spasmodic contraction of the muscles of the calf, as well as of certain of those of the foot.

Case 7.—A lady, æt. 31, subject to hysteria, and having once lain for 3 days in a lethargy so deep that she was believed to be dead, was married at the age of 19, and had 3 healthy children. Another hysterical attack, lasting 24 hours, was followed by general contraction of the lower limbs. This yielded on the next day; but the left foot remained strongly retracted, presenting the appearance of a well-marked varus. The external edge rested on the ground, the sole was very concave, the external malleolus projected, the internal could hardly be felt. This state continued 2 months in spite of all treatment, becoming indeed worse, so that the foot appeared subluxated. After an injection of gr. $\frac{1}{100}$ of sulphate of atropine, which produced toxic effects, the foot, which hitherto could not be brought into its normal position, was now mobile in every direction. The patient was now able to walk, and two smaller subcutaneous injections entirely removed all traces of contraction. ('Brit. Med. Jour.,' June 24th, 1865.)

Dr. Hammond relates some cases of convulsive tremor which are of so much interest that I cannot forbear citing them here.

Case 8.—The first is that of a gentleman, J. S—, æt. 35, single, who was otherwise in good health, but laboured under an affection which he said was driving him mad. Two or three times a day he would be seized with severe and unrestrainable muscular tremor, involving his head, and all the muscles of the trunk and arms. At the same time there would be slight headache and vertigo, and an intense feeling of anxiety. There was no loss of consciousness, not even for an instant, nor inability to walk, or to direct any muscle, and no confusion of thought. After the paroxysm had lasted 20 minutes, it passed off, leaving him in a profuse perspiration. While he was sitting in my library an attack came on. He was seized with as much suddenness as though he were struck with an Epileptic fit. His head shook violently, the muscles of his face were convulsed, his arms and hands trembled, and his gluteal muscles contracted so powerfully as to cause him to move convulsively up and down on his chair. His lower extremities were altogether free from spasm or convulsion. Upon putting my hand on his wrist I found that every tendon was in action, and in the arm, hand, neck and face, the vibration of the muscular fibres could be distinctly seen and felt. The action seemed to be greater on the left than on the right side. The respiration was quickened, the pulse increased from 80 to 95, the temperature of the axilla was 101°, and the æsthesiometer showed increased sensibility of the skin of the face, neck, and all the upper parts of the body that were examined. During the continuance of the paroxysm he conversed rationally, but with some difficulty, owing to the action of the muscles of the neck, mouth, and chest. The pupils acted normally. He was able to walk perfectly well. He had slight headache, confined to the occipital region, and slight but persistent vertigo. The constant tremor prevented him from using his hands in such movements as buttoning or unbuttoning his waistcoat. He was able, however, to grasp forcibly. After the paroxysm had lasted about 15 minutes it began to subside, and in 10 minutes more had entirely passed away. The temperature was now only 98°, the hyperæsthesia had disappeared, leaving the sensibility of the skin natural. The respiration and pulse became normal in frequency. The disorder had commenced 4 months previously, the first attack being during sexual intercourse. He admitted excess in venery. Since the beginning of his disorder he had entirely abstained from sexual indulgence, but his tremors had not left him for a single day. In consequence he was low spirited, and apprehensive of losing his reason. A seton was placed in the neck, the constant galvanic current administered twice a week, and Potass. Bromidi gr. 30 prescribed *ter die*. The constant current was found to tranquillise the tremor when it was present, but the interrupted increased it. In about 7 weeks he reported himself entirely cured, having had no tremor for 10 days, and having altogether recovered his spirits.

The second case is as follows:

Case 9.—A. T—, æt. 21, had been suffering 4 years with a singular disorder, the chief and most distressing feature of which was a spasmodic action of the diaphragm, coming on every 10 or 15 minutes, producing convulsive respiration, a feeling of impending suffocation, and great mental anxiety. The paroxysm lasted 4 or 5 minutes, and then passed off with a long, deep-drawn sigh. None of the respiratory muscles, but the diaphragm, were convulsed. By placing the hands over the abdomen this muscle could be distinctly felt in a state of rapid and irregular action. In the intervals of the diaphragmatic paroxysm there were frequent tremors of the arms, legs, and head. There was almost constant headache, extending across the crown to the cerebellar region. There was no fever, nor increased temperature, but great hyperæsthesia of the whole surface of the body. The catamenia were regular, and there was no evidence of hysteria. There was loss of strength in the upper and lower extremities, so that she was not able to help herself, or move about with facility. Occasionally she was subject to fits of great mental and muscular excitement, during which she fought and bit all who came near her; but there was no mental aberration. Her appetite was bad. She had never had ague. Whilst she was suffering from a paroxysm of diaphragmatic tremor the constant current was passed from one phrenic nerve to the costal attachments of the muscle on the other side, and afterwards from the other phrenic to the opposite costal insertions. The result was that the paroxysms did not return for several hours. This treatment was repeated twice a week, during 20 minutes at a time. A seton was introduced into the back of the neck, iron was prescribed on account of anæmia, and Bromide of Potassium and Bromide of Ammonium ana gr. xx ordered *bis die.* Regular open-air exercise and a full meat diet were enjoined. In about 6 weeks she was almost entirely relieved of the diaphragmatic paroxysm, but a little convulsive tremor still occurred now and then in the arms and legs. In this case, as well as in the preceding, the tremor was absent during sleep.

Dr. Hammond's opinion is that the morbid condition consisted in a disorder of the cerebellum, unattended with any serious organic lesion, and consisting essentially in congestion of some limited portion of its substance. This induced an erethismic state of the nervous system, which was relieved by the remedies employed. ('New York Jour. of Med.,' June, 1867.)

The following is a case of minor severity, but yet instructive from the cause and the cure being both tolerably apparent.

Case 10.—Mr. ——, medical student, had suffered when he consulted me about 6 months with tremors of his muscles, especially those of the calf, in both legs, and those of the jaws. At night he wakes up with chattering of the teeth, from the clonic spasm of the masseters and temporals. Has otherwise good health. Has worked rather hard at his studies for some months, and not had much exercise. Smokes about 3 pipes a day, and drinks tea, but not to any excess. With rest in the country he quite recovered.

The most practical facts to bear in mind with reference to spasms are—(1) their frequent dependence on some removable cause of irritation; and (2) that when there exists no such exciting cause the *quality* of the nervous derangement producing them may be very various, either sthenic, requiring depletion and counter-irritation, or hyperæsthetic, calling for sedatives, or connected with exhaustion, and needing stimulants and tonics. It may be no easy matter to estimate correctly the existing pathological state at the first interview, but a little experience of our patient's morbid character and tendencies will generally put us in the right way. We want further information as to the action of various hypodermic injections, and of galvanism and static electricity.

Mr. Smith, of Leeds, finds that permanent involuntary contraction of muscles may be successfully treated by the following simple proceeding. Place their origin and insertion as far apart as possible; maintain them in that state for some time, their opponents will then be gaining strength, and the balance of power will be restored. He states that he has cured cases of spasm of the masseter, sterno-cleido-mastoid, and various other muscles by this means. ('Lancet,' Sept. 20th, 1851.)

CHAPTER XX.

DROWSINESS.

Drowsiness is a natural infirmity of the human cerebrum in which the medulla oblongata does not participate. The more perfect the brain the less, we may say, is the tendency to sleep. There is no difficulty in understanding that our hemispheres might be as wakeful as the nerve-centres which do not sleep, and it is certain that some individuals make a much greater approach to this fatigueless condition than others. However, it is plain that we cannot reckon ordinary sleep as anything morbid; it is only when it passes certain limits that it becomes this. Before dealing with morbid drowsiness, it seems worth while to consider briefly the causes of ordinary sleep. Dr. Carpenter accounts fatigue or exhaustion, whether produced "by the active exercise of volition, emotion, reflection, or simple sensation," as the most frequent; and this statement is, I think, no needless truism. For there seems to be some tendency at the present day to consider sleep as essentially depending on diminution of the blood-flow to the brain, and not on failure of its functional power. I have no doubt that the brain is anæmic during sleep, as the observations of Durham, Hammond, and others prove, but I consider that usually this anæmia is secondary to the decline of functional activity, and does not give rise to it. When the frame is so thoroughly exhausted that, as Dr. Blanc writes, no sooner was the cow's hide spread on the ground than we would fall into the sweetest and quietest slumber, although hungry lions were roaring only a few yards from us. (v. 'Brit. Med. Jour.,' 1869, Vol. I, p. 372.) I cannot believe that the intracranial vaso-motor nerves did not share in the general paresis, or that the so urgent drowsiness could have been banished by any increase of blood-flow. Numbers of similar instances are on record, and though they are extreme ones, they make it most highly probable that the same view applies to the ordinary case of sleep at the close of a day's toil. The cerebrum, I believe, is in just the same case in this matter as the muscles. When the latter are in vigorous action they surely receive more blood than when they are at rest, but their activity conditionates the hyperæmia, not the reverse.

Passing on to morbid drowsiness, we may notice, under the head of exhaustion, cases of somnolency depending on a wasted state of brain, such as Mr. Humphrey describes to have existed in the late Professor Whewell towards the close of his life. Excessive heat has sometimes the same effect as in a case mentioned at p. 218. So have other causes of general exhaustion. I may refer here to the affection described by M. Dumoutier under the name of the "maladie du sommeil" (v. 'Gaz. des Hôpit.,' October 13th, 1867). It attacks only the negroes of the West coast, and chiefly those of the territories of the Gaboon and Congo, becoming more and more rare as we advance to the north. The first observable circumstance in these patients is an irresistible tendency to sleep, the torpidity being unattended with any suffering. There is also a weakness of the limbs, so that their walk becomes vacillating, and the tactile sensibility seems perverted, and they are hardly able to lay hold of any object to assist them. During this sleep the urine and fæces escape involuntarily. The intellect continues clear, the respiration is normal, and the digestion regular. It seems that the disease is rarely met with except among the slaves or captives brought from the interior. The excessive labour, insufficient food, cruel usage, and moral suffering and despair, probably lead to this slow progressive paralysis and fatal sleep, which almost always ends in death. In one of the cases M. Dumoutier exhibited strychnia and tonics, endeavouring at the same time to dissipate the disposition to nostalgia by amusements and diversion of thought. For 2 or 3 days a slight improvement ensued, but the patient then relapsed into the same state and died. In another case electricity was tried with no better result. At the autopsy neither the brain, nor spinal marrow, nor their membranes exhibited anything abnormal.

On the other hand, I believe that cerebral *anæmia* is an occasional cause of sleep, as in Gooch's description of his own condition, (v. p. 67) in the hydrencephaloid state, in some states of irregular innervation where the *cold* forehead indicates the external as the correlate drowsiness indicates the internal anæmia, in the case of the children at Simla put to sleep by cold affusion (v. 'Graves,' p. 745), and also in the intense drowsiness produced by extreme cold, where the impression made upon the sensory nerves of the surface is reflected on the intracranial vaso-motor nerves, contracts the arteries, and arrests the circulation in the brain. Venous congestion, which is equivalent to anæmia, produces the same effect.

Toxæmic causes are of frequent occurrence, as accumulated carbonic acid or urinary secreta in the blood, febrile miasms, and the so-called narcotic drugs. Malarious drowsiness comes under this head. Soporose affections are stated by Schramm to be of very frequent occurrence in the malarious district where he practises, especially in children. In them they are not serious, but in persons advanced in life they sometimes prove fatal. In two of his cases a paroxysmal gastric neuralgia was replaced by a profound sopor. In some cases of London malarioid remittent drowsiness by day is a marked feature. The following is an instance, though the disorder was more marked than usual:

Case 1.—E. L., æt. 7, female, admitted March 21st; ill 4 weeks. Her mother states that she is sick 3 or 4 times a day, brings up a little froth; after the retching she sleeps for 4 or 5 hours, and then is very deaf for 2 or 3 more. She sleeps well, but wakes up with dry throat in the morning. No tenderness of the epigastrium. Has lost much flesh last 14 days. I gave her Ferri et Quin. Citrat. gr. 6 *ter die*, and Ol. Morrh. ʒj *ter die*. In about 3 weeks all the symptoms had disappeared.

Intracranial pressure, if suitably applied, produces sleep, which may continue for 12 months without passing into fatal coma, as Mr. Cline's case, quoted by Sir Thomas Watson, shows. It is possible that in certain cases unusual drowsiness, like giddiness or Epilepsy, may depend on a cause of this kind, though other symptoms are usually present. Hæmatomata of the dura mater may cause somnolence.

Remote disorder acting in an inhibitory manner on the brain is sometimes a cause of drowsiness, as exemplified in dyspepsia.

The most general statement that can be made relative to drowsiness is that it depends on defective nutrition of the nerve-cells of the hemispheres. All the causes above noticed would have this effect. It is, however, very noteworthy that very similar causes sometimes give rise to the opposite state. Thus fatigue sometimes causes insomnia, and so does malaria. From the above sketch it must be very apparent how necessary it is to form some correct idea of the cause of drowsiness before instituting any treatment. In cases depending on prolonged cerebral fatigue or debility, tonics are likely to be serviceable, and strychnine is perhaps the best for the purpose. Ol. Morrhuæ should also be administered, and in fact the whole list of nervine remedies may be utilised according to the exigencies of individual cases. They should never be used, however, except in aid of a due amount of the natural restoratives, never to spur on a feeble brain to exertions which are evidently too much for it. Tea or coffee, or their alkaloid Thein, might be useful in some particular instances, but probably will be most suitable to cases of the toxæmic group. To combat the drowsiness produced by opium, atropia injected subcutaneously is very efficacious. In one instance where drowsiness came on so much about 5 p.m. every day that the man was unable to go on with his work, I gave atropia gr. $\frac{1}{100}$ in infusion of valerian with a curative result. I presume that the drug relaxed the arteries and promoted the intracranial circulation. Opium may be employed with the same intention as the history given at p. 80 shows.

Cases will now and then occur where the cause of the drowsiness is obscure, at least at first. The following is an instance:

Case 2.—F. W., æt. 22, clerk, admitted March 22nd, ill nearly one year. Of strong make. His face, the cheeks especially, are flushed and of a deep red, and hot. He finds benefit from dipping his head into cold water. Complains that he has shocks in his system as he walks about, drops on his knees, at home is continually falling asleep, even in the streets he has fallen asleep while walking and tumbled against the railings. Is comfortable after 6 p.m., is as strong as ever, but till then from 11 a.m. has great debility and drowsiness. Gets worse if he walks much or is startled. Has a great appetite. Had fits when a child. Never passed worms. Bowels open. Never had ague. Flushes more in face after meals. When the drowsiness comes on he begins to wander and talk at random. He remained under treatment till the end of May and improved very decidedly. The state of the face did not alter much. He took strychnia gradually increased up to gr. $\frac{1}{12}$ *ter die*, besides quinine and iron. These remedies were certainly beneficial, which puts it, I think, out of the question that the drowsiness depended on cerebral hyperæmia. Tonics would surely have aggravated the results of such disorder. On the other hand, there were marked indications of cerebral debility, and the state of the circulation in the face may be ascribed to paresis of the nerves of the arteries. I have notes of a quite similar case (externally) where there were no cerebral symptoms, only debility; tonics were beneficial. These cases give us a practical hint not to conclude too hastily from the outside to the state of the inside.

The histories on record of soporous or lethargic affections throw but little light on their causation. They seem to resemble cataleptic seizures more than any other. Mr. Wyatt relates ('Med. Times and Gaz.,' 1865, Vol. I, p. 111) a case of catalepsy in a healthy male, æt. 21, in which the attacks came on with an irresistible drowsiness, and the patient slept profoundly for 24 to 36 hours. During the sopor his limbs had the cataleptic rigidity, and no stimulation had any effect in rousing him. Mr. Gimson records a case (v. 'Brit. Med. Jour.,' 1863, June 13th) in which prolonged and profound sleep, occurring at intervals during 20 years, seems to have been produced on three occasions by exposure to wet and cold and consequent catarrh. Between attacks of lethargic sopor, catalepsy, somnambulism, and epilepsy, a certain degree of affinity subsists, and though we can form no definite idea what is the real state of the encephalon in these disorders, the fact that there exists a relationship between them seems to me to go some way to prove the view that they severally depend on some peculiar modification of the nerve-tissue itself, and not on mere diminution of blood supply.

The main indication for treatment in cases of this kind is to improve and sustain nerve-force as much as possible, and lessen its liability to derangement. The latter purpose might be attained by the persistent use of Belladonna, as in cases of Epilepsy. Remote causes should be sought for, as it is quite conceivable that the symptoms might depend on inhibitory irritation. Cases, however, may occasionally occur in which such disorder might depend on plethora. Mr. Macnamara relates the case of a beautiful young lady who was almost cataleptic. She would be playing a piece of music, and yet, struggle as she would, she would drop off asleep. She might be going upstairs, and would go so soundly to sleep that a gun fired close to her ears would not have aroused her. All sorts of things were tried without doing her a particle of good. An accidental hæmorrhage occurred by which she bled very freely, and shortly after that she recovered, and was now quite well. ('Brit. Med. Jour.,' 1869, Vol. II, p. 250.)

LEEDS SCHOOL OF MEDICINE

CHAPTER XXI.

SLEEPLESSNESS.

The requirements of different individuals with regard to sleep differ considerably. Some are able to do with comparatively little, others need much more. It is generally those of great mental and nervous energy who at any rate for a certain time can bear the privation of their ordinary repose. Alison says of Napoleon, that, like Wellington and all great generals, he had an extraordinary power of commanding sleep when it suited him to take rest, and of doing without it when circumstances required such a privation. Boerhaave, according to Forbes Winslow, is recorded not to have closed his eyes in sleep for a period of six weeks in consequence of intense study. We may, perhaps, take this account *cum grano salis,* as we read in a note of the same page that a Chinese criminal lived but nineteen days when condemned to be put to death by being kept constantly awake. There is, however, no doubt that in the state of mania patients will pass an extraordinary length of time with little or no sleep, and that all very strongly exciting passions and emotions will have a similar effect. The above remarks may serve to show the propriety of distinguishing a sthenic variety or form of sleeplessness depending on cerebral excitement, or on a state of semi-inflammatory irritation. It has much in common with the sthenic form of delirium tremens, and occurs in various fevers, in inflammations of the cerebral membranes, and in commencing insanity. Mr. Solly reports a case where repeated copious leeching with purgation, followed by gentle mercurials and aconite, produced sleep in about five days, of which otherwise there was but little prospect. Dr. Graves also mentions a case of delirium tremens in which watchfulness was a prominent symptom, but disappeared rapidly under the use of tartar emetic with opium. Such cases are, however, comparatively rare with regard to those of the opposite type where the sleeplessness is dependent upon a state of debility and irritability induced by bodily or mental causes. Dr. Russell has published an excellent paper[1] in which he illustrates forcibly the powerful influence of mental excitement and trouble in causing sleeplessness. The effects of such inflictions are only too familiar, and too often are the secret cause why the best therapy proves inefficient. When, however, the depression is not yielded to and encouraged, or is not too overwhelming in proportion to the strength of the system, judicious medication may often do much to make the burden less felt, the edge of the sorrow less keen. It is most true, and Dr. Russell illustrates it well, that the feeble hyperæsthetic brain collapses under the pressure which an organ of better quality and power can sustain. Now, we have means whereby we can often improve this quality and power to a greater or less extent. Further, the mere procuring a regularly recurring oblivion of distressing impressions is no slight boon, and makes the sufferer more capable to bear his waking burden. Our nature is so compounded of the material and immaterial that what benefits the former is almost certain to do the same to the latter. A girl recently under my care with very various and marked signs of prostration of nerve-power, suffered for many months with exceedingly restless nights, the cause of which appeared to be chiefly great hyperæsthesia. Although she improved materially in other respects she did not sleep well until she was removed from London to a healthy part of the country. I have had several patients, two especially, both temperate males, who for a length of time were quite dependent for good rest at night on wine taken either on going to bed or in the course of the night. Graves mentions that in persons of irritable and nervous disposition he has found musk or assafœtida given more or less frequently during the day effectual in procuring sleep at night. In some cases of this kind it answers well to divert the patient's attention from the idea of remaining sleepless by giving it a new direction, as the importance of being awake to take his medicine at fixed times. In others a placebo, such as a bread-pill, proves a powerful sedative if only the patient can be inspired with faith in its efficacy. Dr. Laycock mentions a case where so long a sleep followed such a medication that it excited alarm. It is not easy to form a precise idea of the state of the nervous centres in which a "night-cap," as above mentioned, is so effectual in procuring sleep. Debility is certainly one marked feature of it, but there must be surely another, even more important, as the most profound debility does not by any means always interfere with sound sleep, nay rather seems to conditionate it. This other element we are much disposed to think is hyperæsthesia, or irritability, which, as already noted, so commonly increases *pari passu* with weakness. In two cases recently under my care the persistent sleeplessness seemed ascribable solely to a special cerebral hyperæsthesia. The condition may be compared with that of neuralgia when it is beginning to give way under treatment, and is so easily reproduced by anything that causes exhaustion. Now, as the stimulant recruits the exhausted nerve-force, the hyperæsthesia ceases, and the brain-tissue subsides into a state of calm repose. It may be added here that it is often well to give not only a stimulant, but also some digestible nourishment about the time of going to rest, or even in the course of the night where debility to a serious extent exists. It is quite certain that a craving empty stomach is by no means favorable to quiet slumber, and in this point of view moderate suppers are far from being unsuitable to many invalids. I well remember the case of a lady who the night after a natural confinement woke up with severe gastric disorder and flatulence, which resisted various medication, but subsided immediately after a plate of cold meat and some brandy and water.[1] Among the various soporifics I doubt if there be any more potent, especially for the weakly and hyperæsthetic, than prolonged exposure to the cold open air. This should be so managed as not to cause great fatigue, and if well timed and followed by a sufficient meal, it will be found an admirable preparative for sound nightly slumber. Where this is impossible, as in cases of severe disease, and especially where, as often happens, narcotics disagree, it is well to try the effect of a monotonous voice. There is no question as to the soporific influence of such tones, particularly when the speaker or reader is detailing some matter which is not without a considerable tinge of dulness. The old monk's prescription for sleeplessness, viz. to tell your beads, was sound advice. The removal of any existing cause of irritation is of course often essential to procure sleep. Surgical cases exemplify this well. A gentleman about whom I was consulted lately told me that while suffering with torpid liver in India he had no sleep for five months until he commenced the nitro-muriatic acid bath and sponging. He thinks that he never slept an hour, and besides had lost taste and smell. He had no jaundice all this time, but objects appeared yellow to him. In less than a fortnight the function of the liver was restored, and with it the senses of taste and smell. Then followed sleep, at first for thirty hours on end, and in six months he was in perfect health. A medical friend informed me that he found a sinapism to the epigastrium an excellent hypnotic in some cases. Dr. Newington has recommended the same agent not only for insomnia, but in mania. He has found it produce sleep where other remedies have failed. His theory of its action is that the brain is in an unusual state of activity, and consequently there is an unnatural determination of blood to the organ preventing sleep. By the remedy blood is driven from the brain and sleep induced. He uses either an ordinary bath made with 5 or 6 handfuls of mustard, or a large poultice to the abdomen, in which the mustard is mixed with linseed meal. Such applications no doubt determine the blood to the surface, but they also stimulate the skin and its vast array of sensory papillæ, and I much incline to regard this as the principal remedial action. I doubt very much whether Junod's boot would have the same effect. The stimulation of the cutaneous nerves tells upon the nerve-cells of the hemispheres and upon the vaso-motor nerves of the intracranial arteries, and excites both to more healthy life.

---

[1] 'Brit. Med. J.,' 1861; May 25th, Nov. 9th, 16th.

---

[1] In his very able and interesting treatise on "Wakefulness," Dr. Hammond, of New York, affirms that I fail to recognise passive congestion of the brain in the states of insomnia above alluded to. He thinks the hyperæsthesia like the wakefulness is merely a result of the cerebral hyperæmia. He will allow me to reply that I distinguish between *active* hyperæmia, in which the quantity of blood passing through the brain in a given time is increased, and *passive* hyperæmia, where it is diminished. The first will cause wakefulness, I have no doubt, the second sopor. Of this the case of aneurism cited at p. 68 affords proof, as well as our ordinary experience in bronchitis attended with congestion of the head.

The conditions necessary for the sleep-repose of the brain seem to be essentially these two—(1) a non-excited or active state of the cerebral tissue; (2) in most cases a diminished afflux of blood to the organ. We have already sufficiently noticed the importance of the first; the following observation illustrates well the need of the second. A gentleman, æt. 24, after considerable mental strain, experienced the following symptoms:—He was thoroughly weary and drowsy at the close of the day, and felt, as he well might, the need of nature's restorer; scarcely, however, had he laid down his head when the cerebral arteries began to throb forcibly, and soon all inclination for sleep was banished, and for hours he lay wide awake, but deadly weary. The *causa mali* here was evidently deficient tonicity in the cerebral arteries, or more exactly paresis of their vaso-motor nerves. As the arteries relaxed they admitted an undue flow of blood to the brain, which goaded its weary tissue into abnormal activity. The effect of altered blood-flow on the brain is also apparent in the following account which Graves quotes from Vigne's work. He states that in Kashmir it is a common practice for mothers to put their children to sleep by exposing the head for two or three hours to a small stream of water. This, as in Brown-Séquard's and Tholozan's experiment of lowering the temperature of one hand by chilling the other, must certainly have the effect of causing cerebral anæmia by contraction of its arteries. In children attacks of malarioid remittent, a disease I shall subsequently describe, are generally productive of very marked sleeplessness. The nocturnal febrile paroxysm seems to generate a state of excitability of the brain, and at the same time to stimulate it to morbid action by accelerating the circulation. Quinine in these cases is a most efficient hypnotic. Adults also occasionally suffer much with restlessness at night in connexion with obscure aguish phenomena, as chills, cold sweats, prostration, and feelings of alarm, or strange terror. In some instances of this kind there is that very peculiar sensation of dread which makes the person afraid to sleep lest it should be a sleep without waking. I have met with this in both sexes. Closely allied to the insomnia of fever is that which occurs from over-fatigue, where the sufferer, though sorely in need of repose, lies vainly expecting it, and finds himself instead wakeful, feverous, and exhausted. In such cases the exhaustion generates a cerebral hyperæsthesia. Here restoratives, with a moderate dose of opium, are requisite. Tea-drinking, though in moderation, will sometimes seriously interfere with sleep. I believe the following is an instance of its poisonous action when taken in excess.

Case i.—J. R—, æt. 47, male, a large stout man, works at a kiln in a brickfield, admitted April 27th. Ill one month. Complains of a tormenting feeling which goes all over his chest and head, and prevents sleep; when he does he has terrific dreams. Does not suffer more after eating. Tongue clean. Pulse quiet. Bowels not regular. Sounds of heart normal. Sanguine aspect. Slight rheumatic pains in the knees. His symptoms did not vary much, he constantly complained of a tormenting feeling "like evil spirits," referred to the præcordia, and attended with palpitation. He was besides weak, and had some tenderness of the scalp, and once some lichenous eruption. I was quite unaware of the nature of the case, and gave him various medicines with little or no benefit till June 22nd, when, as he complained of being restless at night, I ordered him half a grain of morph. mur. *o. n.*, and a mixture of tr. valerian. ammon. + tr. arnicæ + tr. opii *ter die.* He improved by this and was quite well by August 3rd. His wife told me then that she had thought he was out of his mind, he used to lie awake at night without sleep, fancied he was going to be taken away to an asylum. He wanted to tell the hospital chaplain that he was going to be stoned. His illness began with nocturnal restlessness and sleeplessness. He was never a drinking man, but used to drink last summer three or four quarts of tea a day while at work. After his recovery he was conscious of his former delusions. From the præcordial dyæsthesia, and the sleeplessness, and the good effect of morphia, I am strongly inclined to regard the preceding as a tea-neurosis. The history is unfortunately deficient as to whether he had continued his copious libations of tea up to the time of his being taken ill, and as to whether he subsequently discontinued them, but the probability is that he made no change. In all obscure neuroses we ought to consider whether tea may not be the culprit. On the other hand, we may remember that Dr. Stokes has more than once succeeded in producing refreshing sleep by the use of green tea in persons of a nervous habit, where opium and other narcotics had failed.

With regard to the soporific drugs I think that henbane, in spite of the doubts which have lately been thrown upon its efficacy, approves itself frequently as a really valuable remedy. It seems to act as a direct cerebral calmant, affecting evidently the vaso-motor system in a much less degree. It is rare that it has any injurious effects, but I have met with some very susceptible systems who could not take it, or any other form of narcotic. The action of opium, on the other hand, though more potent, is more uncertain and more apt to be injurious. It exerts unquestionably in many persons a stimulating power, at least when given in moderate doses and in the early period of its action. Thus it comes to pass that if the cerebral tissue be highly hyperæsthetic opium unless given in large doses is apt to produce an effect the very reverse of sedative. It seems appropriate to cases where there is some but not profound debility, where the cause of the insomnia consists in some peripheral nerve irritation, where the brain is not highly hyperæsthetic, where the secretions are tolerably free, and generally where there exists any grave and severely distressing affection. When given to obviate sleeplessness of cerebral origin it should be administered in a sufficient dose some time before the period when it is desired that its soporific action should be manifested. I quite agree with Dr. Graves as to the advantage of using it in the form of enema in many instances, and as Dupuytren held the dose need not exceed that which is given by the mouth. In some instances a very small one suffices. Sir R. Martin cured a man of obstinate insomnia by giving him ♏j—iij of Tr. Opii *ter die;* larger doses disagreed entirely. The administration of high doses of opium is one of the most delicate points of practice, and though in skilful hands it gives often excellent results, had better be avoided if possible. The previous use of antimony, or the addition of it, or of ipecacuanha to the narcotic, a cold douche to the head while the body is immersed in a warm bath, or the latter alone may render a smaller and safer dose of opium equally efficacious with a larger. The symptom which would most warrant the exhibition of large doses of opium is severe pain provided at the same time there were no indications of failure of pulse. Large doses of henbane, as gr. 20 of the extract, may in some cases advantageously replace opium. I have given for several nights gr. xxv to a man on the verge of delirium tremens, and sleepless, previously even with morph. mur. gr. ½. When sleeplessness depends on some frequently recurring irritation, as cough, much smaller doses of opium may be sufficient, and they may be repeated according to need. In maniacal excitement, as Dr. M'Leod[1] has recently pointed out, hydrocyanic acid in ♏v doses, frequently repeated, if necessary, is often effectual in inducing sleep.

Forbes Winslow says "a warm bath a short period before retiring to rest, bathing the head at the same time with cold water, particularly if the scalp be unnaturally hot, will often ensure a quiet and composed night, when no description of sedative, however potent its character and dose, would influence the system." ('Lect. on Insanity,' p. 73.)

Last, but not least, we have to mention Bromide of Potassium. It is difficult to overrate the value of this sedative to the physician of the present day in insomnia, as well as in other forms of cerebral hyperæsthesia. No one can have used this drug much in the treatment of Epilepsy without observing its hypnotic action. Half a drachm *ter die* made one of my patients excessively drowsy; she could hardly keep her eyes open after 4 p.m., and almost fell asleep at dinner. Some persons are much more affected by it than others. Dr. Debout mentions the case of a man in whom gr. xv not only procured sound sleep during the night, but made him the next day so somnolent that he was unable to attend to his business. If the Bromide is too depressing 30 or 40 drops of salvolatile may be addeed to each dose, or ʒj of Tr. Cinchonæ. When the object is solely to procure sleep at night, it is best to give the remedy in one or two pretty full doses about the close of the day, say at 9 p.m., and if a second dose be requisite, at 6 p.m. also.

---

[1] 'Med. Times and Gaz.,' March 14th, 21st, 1863.

CHAPTER XXII.

HEADACHE.

We cannot call headache properly a malady, that is to say, if we use the term in the same sense as we do when we speak of Scarlatina or Typhoid fever as maladies; though we cannot refuse at least while enduring it to count it a *dis-ease*. It is one of those symptoms which by its severity, its frequency, and often isolated occurrence, claim some especial attention, and we may therefore allow it a separate niche in our pandemonium. I purpose to do little more than enumerate the various kinds of inorganic headache which are met with, and give some clinical illustrations of them.

One of the commonest kinds is that which coexists with general prostration of nervous power, in which I conceive the state of the brain much resembles that of a nerve suffering from neuralgia of debility. The pain is often severe enough, but the hyperæsthesia of the brain and nerves of special sense is not intense, the mental actions are dull and slow, the patient feels weary and weak, the head is mostly cool, and the pulse feeble and often small. Stimulants are beneficial and may remove the disorder for a time. Teissier describes such cephalœa as characterised by a pain in the head much more continuous and fixed than that of neuralgia, and which may last not only several weeks, but months and entire years without presenting more than rare and slight intermissions. The pain is sometimes dull, sometimes shooting, and sometimes pulsative, occupying only a single point of the head or the whole of the cranium, accompanied by nausea or even vomiting, and complicated besides with much more serious symptoms, such as vertigo and tendency to syncope, inability to think or work, despondency, weariness of life, and sometimes numbness in the limbs. It is especially observed in nervous women, and often coexists with a- or dysmenorrhœa, or menorrhagia, though it is sometimes met with where the constitution is good, and the uterine functions are regular. A variety of this is *hyperæsthetic* headache, where along with more or less debility there is restlessness, excitement, and increased sensibility to all impressions. The amount of pain varies in different instances, but the hyperæsthesia is the more essential feature. The two forms are certainly distinct, though transitional instances are more frequent than typical. The means which relieve the former are apt to aggravate marked instances of the latter. Graves states that in cases of this kind the headache is immediately aggravated, if wine even in the smallest quantity be administered to counteract the alarming state of debility to which such patients are reduced. In the great majority of cases of these two forms of headache there is no reason to imagine that active hyperæmia, or passive, is at all concerned in causing the disorder; there may be some heat of head, but not such as to call for any measures to reduce the blood-flow. Cases, however, do occur, though in my experience they have been very rare, in which hyperæmia plays a principal, if not the sole, part in causation. Graves states (p. 768) that "in the habitual headaches of robust and plethoric young women it is sometimes necessary to have recourse to general bloodletting when the paroxysm is violent." He relates the case of a young lady in whom "the paroxysms of headache were of most distressing severity, and had baffled for years all internal remedies and external applications." During a violent attack she was bled ad deliquium, with immediate and what is more remarkable permanent relief. Dr. Mayo ('Brit. Med. Journ.,' 1863, June 6th) relates that he was sent for to see a lady of nervous temperament, and a habit neither full nor spare. She was subject to head attacks, which were sometimes removed by stimulants, but in their severest forms required depletion. After a severe fright pain came on in the vertex, and gradually increased through the night to an excruciating degree, accompanied by a sense of weight and by sickness. "When I saw her she complained of these sensations and of extreme coldness, which appeared to be increasing upon her." The pulse was small, the visage contracted, the legs and thighs moved spasmodically. After a little brandy and water had been given, 14 oz. of blood were taken from the arm. The blood flowed at first unwillingly, afterwards freely, and as it flowed she expressed a sense of diminished pain and returning warmth. Soon after, the spasms and pain somewhat returning, I allowed 8 oz. more to flow. All the symptoms were from this moment relieved. In about 36 hours from the time of her being first seen, this lady was perfectly well with only a mild aperient in addition to the V.S. Dr. Mayo goes on to say that there is a large class of cases in which the prominent symptoms are heaviness, tightness, and often a sense of fulness in the head, a deficient secretion of bile, and some depression of the spirits. In these cases the treatment formerly adopted was often aided by the abstraction of a small quantity of blood. Men of good appetites and sedentary employments were frequently benefited by it, in addition to some purgative and alterative treatment. Gooch, whom no one will deem one-sided in his views, distinguishes very positively inflammatory headaches attended by delirium in puerperal females from mania, and relates the following case to prove how different their treatment ought to be. A lady, plump, and rather florid, about a week after her first confinement, got dull headache and thirst, followed by throbbing in the head and giddiness; her face was red, her skin hot, and her pulse quick. She was kept on low diet, and purged with calomel and senna, but had become delirious the preceding night. At times she was herself, and answered questions clearly; at others her mind rambled about absent things and persons. I found her sitting up in bed with 8 gorged leeches hanging from her temples, her cheek was red, and her pulse full, firm and throbbing. She told me that her headache was so distressing that she should go out of her senses, that she believed she had been already so during the night. I told the surgeon that I thought local bloodletting was quite inadequate to this case; that it was in vain to empty the small blood-vessels of the brain while the heart and large arteries were pumping it into them with so much rapidity and force; that nothing would do but reducing the violence of the general circulation; and I advised him to bleed her to syncope. This was done, and her headache disappeared, but returned a little in the evening. Twelve leeches were applied, gr. v of calomel and a purge given; she passed a tranquil night, and woke with no headache and a clear mind, and had no return of the symptoms. The blood drawn was buffed and cupped in the highest degree. Such evidence seems to me convincing, and therefore I cannot hesitate to admit the existence of a form of headache the main feature of which is the existence of active intra-cranial hyperæmia. There may be instances where the hyperæmia is not very apparent on the exterior of the head, but if the carotids are throbbing, the eyes red, the pain tensive and aggravated by lying down, and the pulse firm, we ought not to defer sufficient depletion. Not unfrequently it may be evident enough that there is active hyperæmia of the head, while at the same time the heart's action is very feeble, and the general debility very great. The hyperæmia is the result of vaso-motor paresis of the cerebral arteries, and this paresis would only be increased by depletion of any kind. There is no real plethora, only a faulty distribution of blood, which is sent in relative excess to a weak organ. It does not seem unlikely that the cerebral weakness communicates itself to the vaso-motor nerve-centres, which regulate the degree of contraction of the carotids and vertebrals, and that thus, losing tone, they dilate unduly, and cause additional distress. We cannot wonder at the liability of the head to hyperæmic afflux, when we think of its proximity to the heart, and the large size of the arteries proceeding to it, and the degree in which they seem subjected to nerve influence. It is quite common in various states characterised by debility, as rickets, to have the head and neck bathed in sweat, while the lower part of the body and limbs are comparatively free.

Having now described nervous and hyperæmic headache, we come to that which is termed Sympathetic, and to which I would assign as a synonym "inhibitory." The characteristic of this is that it is dependent on remote irritation, the seat of which may of course vary greatly. The stomach is very commonly believed to be one of the most frequent, but I doubt whether the frequency is not exaggerated, for (1) it has not appeared to me that patients having severe stomach disorder suffer especially from headache; (2) in not a few instances of coexisting gastric and cerebral derangement the brain is primarily affected; (3) vertigo appears to be a more marked symptom of gastric disorder than headache. Dr. Copland expresses the same opinion. Of course in cases where, as sometimes happens, all the symptoms disappear after the expulsion by vomiting of abnormal matters, there can be no doubt that the stomach is the seat of irritation. The rectum is another locality which is apt to cause similar trouble. A writer in the 'Med. Times and Gaz.,' 1866, says, "What may be the particular connection between the posterior region of humanity and the brain we do not pretend to say, but we know that it is impossible to give undivided attention to business or study when the rectum is irritated with what it can't readily expel." Dr. Sieveking describes an hæmorrhoidal form of headache occurring in persons of middle or advanced age with a sallow dry complexion, and more or less subject to piles. "A peculiar irritability of temper is often characteristic of such individuals. The headache is sudden, violent, and vertiginous; they see muscæ volitantes, or strange figures; a black veil is occasionally drawn over their eyes, and the threatened loss of sight excites the greatest alarm." There is no vascular excitement, but a general sense of lassitude, with restlessness and discomfort ('Med. Times and Gaz.,' 1854, August). Dr. Heslop describes the headache produced by worms (tænia) as dull, not limited to any particular region of the cranium, but perhaps more marked in the frontal region than elsewhere. This headache does not offer any marked exacerbations or remissions, but is almost constant, and sufficiently severe to render life, if not a burden, at least unhappy ('Dublin Med. Jour.,' 1859, May, August). The influence of uterine irritation is well illustrated by the fact mentioned by Dr. Churchill, that in neuralgic dysmenorrhœa headache may alternate regularly with pain in the back. The same writer mentions that in cases of so-called irritable uterus, headaches alternating with pain in the back are frequent. Uterine and ovarian tumours do not seem to have any noteworthy influence in causing headache. Acute suppression of the Catamenia in plethoric and robust women is very apt to give rise to headache, violent hysteria, sometimes delirium, and as in these cases actual metritis according to Dr. Ashwell exists the effect on the brain may reasonably be regarded as the result of this remote irritation. In spare and delicate women catamenial arrest is more likely to give rise to aggravated pain and nerve disorder, shifting repeatedly its seat from uterus to head, and thence to the heart, and again to the intestines. This may seem suggestive of toxæmia as the cause of the symptoms, but I doubt whether this is really the case, because it is not uncommon for the catamenia to cease entirely during a sea voyage to India without any injury at all to the health. Dr. Ashwell himself mentions 6 instances of premature cessation of menstruation at or before the 31st year without any ill result.

It does not appear that there is anything special in the phenomena of sympathetic or inhibitory headache which distinguishes it from the primary malady. The accompanying symptoms differentiate them in most instances by indicating the primary seat of disorder, but the head distress itself has no reliable distinctive features.

Febrile headache may serve as a term to include those more or less distressing attacks which attend on the early period of most fevers, including Influenza and inflammatory pyrexia. The severity of the influenzal headache is notorious. A group closely allied to this, regard being had to the nature of the cause, is the Toxic; whose chief feature is that the disorder depends upon the presence of some demonstrable poison in the blood. As instances of this we may mention that occurring in Gout, in Renal degeneration, in Alcoholic, and Carbonic acid poisoning. Dr. Garrod says, "A severe form of headache is not uncommon in gout; sometimes it occurs prior to the development of the joint inflammation, and then it usually vanishes at once on the occurrence of the latter, and now and then the alternation between the headache and the toe affection is characteristically and unmistakably marked." Dr. Copland says it may be the first manifestation of the gouty affection, and evidently implies in his description that the brain itself is affected. Chronic M. Brightii is sometimes attended with severe pain in the head, as in a case mentioned by Dr. Sieveking where it was intense; and it is worth notice that in a similar case lately under my care there was such a complete absence of anæmia and anasarca that the renal disease might most easily have been overlooked. Heat-stroke occasionally causes severe intermitting headache (v. p. 220).

In all the above noticed varieties of Headache I believe the brain itself is chiefly, if not exclusively affected, for the reason that its faculties are often notably impaired, but there remain three groups in which the morbid action seems usually to have its more special seat in the membranes or in the outer teguments, or rather I should say in the nerves supplying them. I refer to Neuralgic, Rheumatic, and Syphilitic head pain.

One great cause of *Neuralgic* headache is probably that modification of Malaria which prevails even in non-aguish places at certain times at any rate, and which has some close affinity with the cause of influenza.

Gout also may be the cause of extra- as of intra-cranial headache. Trousseau relates an interesting example of hemicrania replaced by gout in the foot, and states that the articular and the neuralgic affection often alternate in the same individual, and that the latter may be the sole manifestation of the diathesis in the offspring of gouty parents. Other possible causes are such as give rise to neuralgia in other parts.

Rheumatic headache is mostly extensively diffused over the cranium, accompanied with tenderness to tapping, is aggravated at night, or by the warmth of bed, and occurs in those who have distinct rheumatic tendencies. It may be attended with suspicious head symptoms, and then there is especial reason for regarding the dura mater to be affected as well as the pericranium.

Syphilitic headaches are often hard to distinguish from Rheumatic for a time, but sooner or later the diagnosis is ascertained by the more localised character of the pain, by the actual or previous existence of constitutional symptoms, and by the cerebral affections being more grave and permanent. Mr. Hutchinson mentions that in cases of Tertiary Syphilis the bone in contact with the dura mater becomes roughened, and gives rise to various forms of disturbance of the sensorial functions, one of which is violent headache. Such a case I shall presently relate.

Treatment.—In hyperæmic headache, if there be plethora and a firm pulse, bloodletting is requisite, and cupping from the neck will generally be the most advisable mode. The bowels may be kept regular with small doses of Croton oil ♏¼ in Extr. Coloc. Co. The cold douche to the head should be applied daily, and for a time sufficient to produce a decided effect. If further means are requisite Pulv. Colchici gr. v, *4tis vel 6tis horis*, would be found efficacious.

If there be only local determination of blood depending on debility the cold douche, aided by the hot or sinapised pediluvium, repeated dry cupping, suitable aperients, sedatives, and sooner or later tonics, which may be given with aperients, constitute our usual remedies. Graves speaks highly of two drugs in the class of cases we are considering, viz. Oleum Terebinth. and Argent. Nitras. The former, he says, is best suited to the violent stages of the disorder; the latter may be given when the paroxysm has abated or the turpentine has failed. Trousseau also praises turpentine, but admits that it fails in at least half of the cases (of neuralgia) where it is given. He always administers it in the form of capsules, and insists on its being taken so as to mix with the food. It may be given to the amount of ʒiss to ʒvj per diem during 6 or 8 days; then it should be omitted for 4 or 5, and then resumed; and so on for several weeks. It is probably as a peculiar nervine stimulant that this remedy is useful, for Teissier recommends it in simple neurotic headache.

Nitrate of Silver Graves calls invaluable in the treatment of neurotic headaches both in men and women. I have certainly found it beneficial in cerebral disorder more or less allied to Epilepsy, but

I have not had much occasion for its employment in headache. It does seem, according to various testimonies, to act remedially in some morbid affections of nerve-centres, and if given for only a few days, or not more than 3 weeks at a time, there need be no fear of discoloration. One advantage attending its use in cases where the bowels are constipated is that it often has a decided aperient action.

While, however, I do not doubt the utility of such remedies as Turpentine and Nitrate of Silver, especially in severer cases and in the earlier stages, I yet think they are not the most valuable, and I believe they may be often dispensed with. The ordinary tonics well managed, and aided by dry cupping and good hygiene, will often do all we want. Sedatives, however, are also very useful in many instances. When we desire a more stimulant effect we may give opium or morphia; when these would prove too exciting, Indian hemp, Aconite, or Bromide of Potassium. The latter is certainly of much service to hyperæsthetic brains; a nightly dose of gr. xxx keeps one of my patients, an inveterate neurotic sufferer, tolerably free, but if she leaves it off her head begins to ache again. It seems, however, to require a certain amount of *vis vitæ* in the patient, for in some very weakly persons it causes great depression, and gives but little relief. Dr. Symonds speaks very favorably of aconite, whose effect in some cases is marvellous. He gives ♏j—ij of Fleming's tincture, or gr. $\frac{1}{8}$ or gr. $\frac{1}{6}$ of Morson's alcoholic extract, repeating the dose in 2 or 3 hours if needful. The instances in which he has seen "most good result from aconite have been those in which there has been a more chronic species of pain—a constant soreness or disposition to ache. In these a very small dose administered thrice daily has been found very salutary, whether combined with tonics or taken singly." Aconite should hardly be given unless we are tolerably sure of the validity of our patient's heart. Some persons are extremely susceptible of its influence, and a relative over-dose might be a very serious thing to them. In a great many cases we shall do well to act on the principle that a combination of similar remedies acts better than any one of them singly. Chlorodyne, a mere jumble of sedatives, often excels any of its components given separately. It relieves speedily the lady whose case I alluded to just now when her headache is severe. A little chloroform inhaled is sometimes of much service for the time, though it has no power to remove the tendency to recur. Trousseau advises the patient to pour 10 or 20 drops into his hand, the fingers being half closed so as to form a cone, and to make a deep inspiration. This is sufficient to produce, in some persons, a brief unconsciousness, in which the headache disappears.

Local applications are not very conveniently made to the head so long, at least, as it is well covered with hair. I have, however, found an unguent of Atropia gr. j + Glycerini Amyli ℥j, and a liniment of Chloroform + Tr. Belladonna + Linim. Opii usable and useful. Dr. Graves relates the case of a lady who suffered from paroxysmal headache of great severity, lasting sometimes for several days, and attended occasionally with intense agony. In the intervals her health was tolerably good. There was no tenderness in any part of the head, or feeling of external soreness, "the sensation of pain being constantly referred to an internal headache." After various remedies had failed a plaster containing 40 grains of opium and 30 of camphor was applied to the shaven scalp, and this proved effectual. Subcutaneous injection is scarcely a local means, but I may allude to it here as having proved really useful in painful head affections. Dr. Kennion proposed the Bisulphide of Carbon as a local means of great efficacy in many forms of nervous headache, the neuralgic, periodic, hysterical, and even dyspeptic. He says ('Brit. Med. Jour..' 1868, Vol. I, p. 584) that they are almost invariably relieved by it, and that promptly. The mode of application is simple. About ʒij of Morson's solution is poured upon cotton wool, with which a small, wide-mouthed glass-stoppered bottle is half filled. When used the mouth of the bottle is to be applied close to the surface to the temple, or behind the ear, or as near as possible to the seat of pain, and held there for 5 or 6 minutes. After it has been applied some minutes (3 to 6) the smarting and pain become rather severe, but subside almost immediately after the removal of the bottle. It is very seldom that any redness of the skin is produced. The effect is generally immediate. It may be reapplied if necessary 3 or 4 times a day. A correspondent states in the same journal (v. p. 626) that he has long been in the habit of applying chloroform in the same manner, and with the same happy results. In a case of agonising hemicrania which came on a few hours after childbirth it gave relief and procured sleep. Mr. Little (v. 'Edin. Med. Jour.,' 1860, p. 964) used the same means in neuralgia and various nerve disorders.

In the management of stimulants and tonics the chief point to be attended to is "festinare lente." A very weak and sensitive brain may be quite unable to tolerate a dose at first which at a later period will cause no inconvenience. The ammoniated tincture of Valerian, with Bromide of Potassium in solution, salines, with nervines and ether (Symonds), valerianates of iron or quinine, with opium, valerianate of ammonia, carbonate of ammonia, with Tr. Valerian and Infus. Valer., Tr. Sumbul, Tr. Cinchonæ flavæ constitute a pretty copious list of remedies from which a little practical tact will enable us to select those most suitable to the individual patient. We should not forget that success may depend upon our administering a dose large enough, as well as one small enough. Dr. Symonds (accidentally) obtained "marvellous benefit" in one instance from six grains of Valerianate of Zinc given every 3 hours. Of the more proper tonics Strychnia, Quinine, Iron, Arsenic, Nitric acid, little need be said. They are all suitable in nearly the same conditions, viz. where excitability is replaced more or less by passivity. At the same time we may often use them advantageously in the hyperæsthetic by managing the doses and combining them with sedatives. Idiosyncrasy, however, also is largely concerned in making one or other more suitable and efficacious. I am very partial to Strychnia either alone or with Nitric acid, or with iron, or with Citrate of Iron and Quinine. "It is a wonderful thing for the head," as a lady who frequently takes it remarks. It is better, I think, to prescribe it in extemporaneous combinations, where the proportions of the several ingredients can be varied at pleasure, than in the ready-made syrups which are so much in favour. Of these, perhaps, Easton's, containing gr. $\frac{1}{32}$ of Strychnia to ʒj, together with iron and quinine dissolved by phosphoric acid, "three phosphates rolled into one," as Dr. Wilks says, is the best. Tincture of nux vomica may be used in place of small doses of strychnia, and may agree with some hyperæsthetic subjects better. When iron seems specially desirable the best forms of administration are Vinum Ferri with Spt. Æth. S. Co., or with Chloric Ether, the Ammonio-Citrate, with Ammoniæ Carb. and Tr. Calumb., the Sulphate with pil. Galbani Co., or pil. Aloes c. Myrrhâ, the saccharated Carbonate in powder, or Mist. Ferri Co. recently prepared, or Carbonate of Iron water. Allarton's biscuits are very suitable for children, and many invalids. They contain each one grain of Ferrum redactum.

Of Arsenic as a remedy in nervous headache, apart from facial neuralgia, I know very little. Dr. Symonds finds it most successful when the malady is periodic.

Hydrochlorate of ammonia is recommended by Barrallier as the best therapeutic agent in cases of nervous headache. It is to be given during the paroxysm, three doses (each of 20 grains) at half-hour intervals. If administered during the absence of the headache no remarkable effects are produced. Besides the temporary relief it was observed that in cases of headache returning in periodical paroxysms several times a month the intervals gradually became longer, the attacks diminished in intensity, and ended by disappearing completely, after having been several times arrested by the ammoniacal potion. It has proved effectual in idiopathic hemicrania, in headaches consequent on repeated attacks of intermittent fever, those occurring in the decline of low fevers, and in that of the period of irritation in typhus. ('Edin. Med. Jour.,' August, 1859.)

The following cases I venture to think will repay perusal:

Case 1.—Mrs. F. S—, æt. 38 (?), seen July 27th, 1861. Has been much in India, but never had fever or ague. Has no mental distress. Looks thin, wan, and poorly; forehead large; peculiar expression of countenance, giving one the idea of impending insanity. Has suffered for three or four years with headache paroxysmal, but very severe indeed while it lasts, which is from twelve to forty-eight hours. It returns once or twice a week; is relieved by nothing but chloroform (inhaled) and morphia, the latter acts slowly, she takes 2 grains without any sopor ensuing; chloroform relieves immediately. At the time when the headache is present is almost distracted by violent throbbing at the vertex, which is somewhat relieved by firm pressure. Head then seems hot to her; it is cool now. She can lay her head down without increasing the pain. Superficial veins of neck very large. Does not sleep well always, has sometimes restless nights preceding the attacks of headache. Some decayed teeth, but they cause no notable uneasiness. No worms. Urine palish, free, acid, sp. gr. 1011. Pulse soft, weak. Skin cool. She was ordered strychnia with citrate of iron and quinine *ter die*, and to take supper with malt liquor at night. In about six or seven weeks she had benefited very much, slept better, but still had to take a cup of cocoa in the course of the night. At this time she had hemicrania of the right side, which she said was quite different from the head attacks she had had previously. The veins of the neck did not appear full now. A month later she suffered pain extending down the right leg from the hip to the toes, apparently in the centre of the limb, quieted by cold, and induced by heat. Nov. 8th.—Pain has shifted from leg to arm, the right shoulder and arm are stiff and painful each morning, the pain runs down the arm. "It is a misery to turn or move in bed." During the day the pain subsides. Headaches less and less. This arm-pain was soon cured by chloroform liniment and the Turkish bath. Jan. 6th, 1862.—The headache has recurred the last three weeks with hysterical symptoms and depression. Feb. 7th, 1865.—Her sister tells me that she has been getting on very well indeed for some good long time; the headaches have not quite left her, but the intervals are longer, and the attacks less severe; no medical treatment required. It is most probable that the neuralgia in this case was of malarious origin, although there was no history of fever. The tonic treatment plainly averted to a great extent its recurrence. The disorder exhibited the usual shifting tendency of neuroses; its hemicranial manifestation, and the quasi-rheumatic affection of the limbs was less distressing than the original in which the brain itself seemed to suffer.

Case 2.—Mrs. W—, æt. 24, has been much in India during her early life, and has been under my care previously for neuralgia of the side, and for erythematous flushing of the face. Has had brow-ague three or four times. Pregnant about seven weeks. She has been suffering severely for three or four days with pain in the head chiefly on the left side, and such great irritability that the mere rustling of paper distresses her. Her face looks somewhat flushed and oppressed. Pulse rather excited. Appetite tolerable. Tongue clean. Urine pale. Bowels open. The headache remits during the day, but comes on severely about 5 or 6 p.m. During the night she is markedly feverish, and wakes often from short dozing sleep. With quinine at first, and quinine and iron afterwards, the headache was reduced to a minimum in about a week.

Case 3.—A. P—, æt. 20, female, married, admitted April 29th. Ill five or six months. Suffers with head; "comes over with such sensations that she quite goes out of her mind." Head cool, it feels giddy and confused. Left hand and arm get numb at times, and her speech fails. Catamenia regular. Much palpitation. Functions in order. Ammonia, iron, and calumba, were highly beneficial.

Case 4.—A. H—, æt. 50, female, admitted Nov. 16th. Ill three months; head feels light, and sore and weak, occasionally has sharp darting pains in it, which make her stagger. Can't sleep at night for tenderness of head. Some deafness. With iron, calumba, and cod-liver oil, and henbane at night, all her symptoms very much improved.

Case 5.—M. A. B—, female, æt. 39, admitted Nov. 3rd. Ill a week. Has been suckling eight months. Has a peculiar pain in the head which she cannot describe, is very irritable, and at times says she is quite violent. Is afraid to be trusted by herself. Does not sleep at night. Memory very failing, can't remember from one day to the next. Can't endure the slightest noise. Pulse 100, small. Pupils of medium size. She benefited very much with ammon. carb. gr. v + æth. chlor. ♏x + liq. opii sed. ♏xx *ter die.* In a week she slept better, appetite was better; the pulse had fallen to 72, and was of good volume. In this case there was a marked blending of the symptoms of cerebral exhaustion with those of hyperæsthesia and excitement; pretty full doses of sedatives were certainly beneficial combined with stimulants, but did not act so well alone, as they were given for the first three days.

The following case affords a good example of neurotic headache.

Case 6.—L. R—, æt. 44 (about), married 5 years, no children, a very intellectual person. Has a peculiar expression of suffering and depression, brows rather knit, temporal arteries very tortuous. Of slight make, skin of a dull earthy tint, always dry, if perspiration occurs she feels better. No liability to rheumatism or gout. Pulse very feeble, surface cool, tongue rather white. Digestion fairly good, but appetite poor. Catamenia ceasing now. Is intolerant of tonics and stimulants, takes only a little claret. Has very little exercise. Never has any occasion for a mouchoir, never takes catarrh. Has plenty of hair, but it is very dry, soon dries after being wet, owing she says to the heat of her head. Bowels costive. Urine pale, and passed frequently when the headache is present. When a girl had a prolonged attack of convulsive hysteria followed by amenorrhœa, for which leeches to the groins were so injudiciously applied that she was reduced to the most extreme state of anæmia. Since that time she has suffered from headaches more or less, which are now very distressing and frequent, the free days being much less frequent than the bad days. She sleeps well, but the headache begins in the morning and continues till night as a sense of pressure and heat at the fore and upper part of the head. It incapacitates her from attending to anything requiring attention, and is aggravated by exercise, but not notably by lying down. Sometimes when very bad it induces a slight attack of hysteria, relieved by sal volatile. In severe cold she is worse, but is not much affected by season. The urine was (when examined) 30 ounces in 24 hours, sp. gr. 1013, deposited some squamous epithelium with a good deal of medium-sized oxalate, chiefly octohedra, some dumb bells also being present. It was noticed that when she laughed the veins of her head and neck filled remarkably. On the occasion of a very bad attack her face was very much flushed and the veins of the neck were greatly distended. Proper hygienic measures she could or would not adopt, so no great amount of improvement was to be looked for. Bromide of Potassium and Colchicum in small doses were of service. There can be no doubt that hyperæmia, active hyperæmia, formed an important element of the disorder in this instance, and the view which I take of its causation is that the vaso-motor centres regulating the blood flow to the head shared in the general neurolysis of the encephalon. The latter, however, was in a state of hyperæsthesia rather than of simple depression, and therefore the increased activity of the circulation was the more distressing. Such cephalalgia as this might easily have passed into Epilepsy.

Case 7.—C. R—, æt. 54, a tall well-made man, a confrère, who had been much in the tropics, consulted me respecting severe headache, from which he had suffered 8 years. He had previously had chronic dysentery for 20, but it had ceased the last 6 years. He had fever frequently in Jamaica, but not in India. Has been much exposed to the sun, but never had sunstroke. During the last 12 months he spent in India he did not dare to go into the sun. He had once a severe fall from his horse, was dashed against a tree, but not completely stunned; has never received any other serious injury to head. Before the attacks of severe headache commenced, for 3 years he used to have rheumatic pain at the occiput, which was cured by the shower bath. Feels very well often the day before a headache, with a sense of craving hunger; these signs were in India, and continue at home to be the forerunners of a bad attack, and he has found nothing to ward it off. The headaches while in India were at times so fearful that he was on the very verge of insanity, "was just like a madman," all his nerves felt just as if they were long cords fastened to the top of his head, and some one was pulling at them. He would have been grateful to any one who would have dashed his brains out. The pain was situated chiefly at the fore and upper part of the head; it was not superficial, but deep seated in the brain. His sensation while suffering is that the vessels of the brain are loaded, and he gets relief by throwing the head far back over the back of a high chair, which seems to drain the vessels, and he then sleeps, and gradually the headache leaves him. The duration of the attacks varies from 8 to 104 hours. During the continuance of the headache feels utterly prostrated, only moral control keeps him from suicide. Before the attacks the heart's action is laboured, and the pulse forcible. Some hours previous to the headache the urine becomes very scanty, only 5 or 6 oz. in 18 hours being passed; as the headache goes off a large flow of pale urine occurs. Sometimes, however, the flow of pale urine occurs at the commencement of an attack. The face is very often flushed during the headache and cold applications give some relief, but after a time has elapsed the forehead gets perfectly cold, the headache nevertheless continuing. The headache sometimes wakes him out of sleep. Bodily or mental fatigue greatly aggravates the headache. No notable tenderness of head. During the attacks cannot bear noise or light. Tea used to give great relief until he had got too weak, when it brought on palpitation. Morphia also relieved greatly and chloroform, but both at last lost their efficacy. Has starved himself 10 days in every month on account of headache. He benefited materially by going to a cold climate in India. Spasmodic snapping of the jaw was a sign of the headache beginning to subside; once the spasm amounted to a good deal of clonic convulsion. His sight is good, but was getting weak before he left India. His hearing was failing at the same time. His memory was very much impaired in India, he had lost the recollection of words to a notable extent. Since his return to England 6 months ago the headaches have shown a tendency to periodicity, but the last month they have returned quite irregularly. At present the attacks occur once every 4 to 7 days, and last 5 to 15 hours. His urine was of sp. gr. 1015, wheyish, contained numerous torulæ, no albumen. I advised Potass. Bromid., Ol. Morrh., and during the attacks Indian hemp. About 2 months after I first saw him he was decidedly better; he found that he could check an attack coming on by an extra dose of gr. xv. After a fall on the ice which more than half stunned him, a severe attack of headache came on immediately and continued 30 hours. The hemp was rather injurious. Six weeks later he had improved considerably and gained strength. A bad attack came on after a walk of 8 or 10 miles. About 5 weeks later he was in much the same state, had some baddish attacks, but had got much more nerve, so that he drove boldly about in a 2-wheeled conveyance, which he dared not do in India. He had tried while abroad purgation, starving, cholagogues, arsenic, strychnia, nitromuriatic acid, with no marked benefit.

The points illustrated by this history are the production of intense head pain by enfeebling influences, viz. heat and malaria; the intermittency of the effect produced, the causes remaining pretty constant; the almost certainty that the brain itself was the seat of morbid action; the failure of memory as a co-result; the relief afforded by lessening the blood flow to the head by position, although it is certain that the pain did not depend on hyperæmia; and the good effect of sedatives and a cooler climate. One cannot help asking oneself in what respect such disorder as this differs from mania or delirium, and the answer I am inclined to make is that in both the hemispheres are involved, but that the nerve-fibres are primarily and chiefly affected in the former, the nerve cells in the latter. The paroxysmal character of the disorder marks resemblance to Epilepsy, from which it differs however in the medulla oblongata remaining exempt. It would not be incorrect I think to designate this case as one of *cerebral neuralgia*, marking thereby its pathological affinity to ordinary peripheral neuralgia.

Instances of malarious headache are so well known that I only record the following summarily, for the sake of its bearing on the question of the relation of the state of the circulation to pain.

Case 8.—C. S—, æt. 40, seen Dec. 14th. Had quotidian ague for a month the previous winter, and had yellow fever in the Crimea. His present illness came on 14 days ago while he was in London. He complains now of great pain all over the head with tenderness on tapping. His forehead is hot, and the two median frontal veins as well as others are turgid. His body feels quite hot, but his feet are cold as ice. His head always gets worse about 8 or 9 p.m. Has had no sleep since his illness began. Thirst. Temp. = 100·5°. Neither spleen nor liver enlarged. Urine free, not albuminous. He was treated with full doses of

Quinine and Bark, and afterwards took Arsenic. His amendment was satisfactory; in about 3 weeks he had only a little shoot of pain now and then, all tenderness had ceased, and he slept well and had gained strength. It was noteworthy—(1) that he retained to the last a tendency to fever at night—"was wonderful hot;" (2) that while he was hot he sweated simultaneously and felt weak; (3) that during the febrile paroxysms his feet, the parts most remote from the heart, and where the arteries would be most liable to contract, remained cold; (4) that as the pain and tenderness lessened the turgidity of the veins ceased; (5) that a red papular rash came out on his forehead and face as he got well, and continued 14 days or more. The neuralgia in this instance coincided with some amount of fever, with tenderness or hyperæsthesia, and I think with hyperæmia of the head. The sensory paralysis concurred with vaso-motor.

Case 9.—T. A—, æt. 26, married, admitted May 2nd. Ill four years, always weakly. Is very nervous, and has pains in his head. Complains that strange almost uncontrollable thoughts come into his mind. Anything that excites him in the day makes him wake up and call out at night. Feels very weak. Bowels costive. Quinine, iron, strychnia, and opium were of very great service to him. He remained under treatment over three months.

Case 10.—G. W—, æt. 36, admitted August 2nd, 1867. Ill 7 days, suffering with severe pain at the back of head, which is worse at night. Left posterior part is markedly tender. Eyes feel very sore, and as big as a horse's. Feels extremely weak. Denies syphilis. Pulse weak, 66. Urine high coloured, sp. gr. 1020, not albuminous. Three days later the pain in his head was very severe at times; his sight is then much impaired, and he is unable to distinguish anything; these symptoms go off in a few minutes and return in about 2 hours. His bowels were rather confined on 6th and he was ordered blue pill and colocynth with Ol. Croton ♏ ⅓. The pills operated very little, but caused severe crampy pains for 20 hours, and some vomiting. Two days after taking the pills hæmaturia came on and continued 3 or 4 days. Potass. Iodid. in gr. v and gr. x doses did little good, but a blister to the neck was of some benefit, and with effervescing saline and prussic acid, and what I think was most important Extr. Cannabis Ind. gr. ½ *quater die* the head got quite well. Strychnia was afterwards given with much advantage to his health and he went out very well. He was quite well before this illness. This was a case of neurotic headache, yielding to sedatives. I have never found croton oil produce hæmaturia in any other instance.

Case 11.—A. D—, æt. 43, seen May 18th, 1866, of strong make. Last 3 months has been suffering from persistent deep-seated headache felt in the interior of the head, about on a level with the anterior cranial fossæ. It is worst in the morning, disturbs his sleep sometimes. Work does not increase it, strong coffee has benefited it. The head is not tender. But for this disorder his health is perfect. Abstinence from alcohol the last few weeks has not brought any improvement. Is of gouty tendency, taking malt liquor or port wine would bring on an attack. His family are apt to have serious head attacks at the age of 48, his father had then an attack of apoplexy with temporary paralysis. I ordered Strychniæ gr. $\frac{1}{20}$ + Acidi Nitrici ♏ij + Aq. ℥i *ter die*, and Ol. Morrh. ʒi *bis die*. I did not see him again till August 11th, when he told me that he had persevered with the strychnia till the last 10 days and was very much better; he had almost no headache. He lived well, taking half a bottle of ordinary Burgundy daily. His only trouble was that he dreamt very much at night of horrors, murders especially, which is quite unusual for him. This was probably a neurosis, consisting in a modification of the morbid state which caused the headache. It is possible that the gouty diathesis was concerned in the disorder, and if so it is worthy of remark that a cure was obtained not by eliminative treatment, but by tonic. The *rationale* of this is I conceive that in this, as in lead colic, malarious fever, and many other instances, it is much more feasible to raise and improve the general health and vigour than to drive out a poison, and when this is done the poison is no longer capable of causing disorder. This is a principle of great importance in therapeutics.

Case 12.—C. W—, æt. 44, admitted Jan. 12th. Has suffered from headaches almost constantly for the last two years. Is of stoutish make, not anæmic. States that she suffers from pain in the chest, and in the arms and legs, which is much worse at night; can't lie down in bed, feels suffocated, and is obliged immediately to get out. Has frequently frightful dreams. At times feels almost induced to commit suicide. Bowels very confined, unless she takes medicine. Pulse 108. Has much pain at mid-sternum, extending up into throat, with sensation of choking. March 12th.—Is in a state of the most extreme hyperæsthesia, crying and agitated; can't sleep, walks about the room all night long. No appetite. Urine scanty and thick. Says her illness commenced with rheumatic pains in left arm extending up to shoulder; these have been gradually leaving her, and the arm, which was very weak, so that she could not hold a teacup, has become much stronger. Her head and nerves became affected three or four days after the rheumatism came on. June 4th.—She was discharged very much improved, had been mending steadily since March 16th. She was treated at first with aperients and antispasmodics, and with material benefit, but after the relapse, March 12th, she took calomel and colchicum at night, daily *ad vices iv*, then *alt. noct.* for a week, then twice a week for more than a month. Black draught was given almost daily for nearly the same time. The hyperæsthesia and nervous distress in this case were very great, quite verging on insanity, and proving that the cerebrum was essentially involved in the morbid action. There was no indication of gout. I doubt whether mere purging was the efficient remedy, as she had taken aperients pretty freely before her relapse, including at last nightly doses of ol. Crotonis ♏ $\frac{1}{3}$. Such cases do seem to require attention to the secretions, whatever port-winepathy may say.

Case 13.—E. A—, female, æt. 32, admitted August 30th. Ill fourteen days, ailing a long while. Suffers with dreadful headache and sickness; the headache extends from the front to the back, is constant, and is not affected by position. Left side of face, and tongue, and arm, and hand, are numb, the numbness begins in the tips of the fingers and extends upwards to the face, lips, and tongue. At these times her speech becomes thick, and continues so for an hour at times. The attacks of numbness occurred two or three times a week or oftener. Has no appetite, food causes pain, and is vomited directly. Has a sensation of tremor at stomach. Bowels open. Tongue whity. Skin cool. Pulse good. Feels very weak. Head a little hot. For the first three days she had strychniæ gr. $\frac{1}{20}$ *ter die*, but without any benefit. A blister was then applied to the epigastrium, and she took acid. hydrocy. dil. ♏v + mist. pot. citrat. ℥j (efferv.) *ter die*. This soon stopped the sickness, and then tannin pills were given *bis die* in addition. By Oct. 16th she was very much better, the stomach was right; she had had two returns of the numbness, but much less than it used to be. In this case the gastric disorder was primary, and the head-pain and cerebral paresis were produced, as I believe, by an inhibitory action exerted through the sensory nerves of the stomach on the higher nervous centres. Various morbid conditions of the *primæ viæ* will give rise in predisposed persons to headache. Dr. Prout[1] describes excessive acidity of the cæcum as producing in certain persons severe frontal headache, attended with complete intolerance of light and sounds, and a state of mind bordering on delirium. After a longer or shorter duration the pain ceases, sometimes quite suddenly; and this sudden termination Prout connects with a relaxation of a spasm of the bile-duct, and a flow of bile into the intestines, partly from a description of the sensations which others have invariably experienced, and partly from his personal experience of the disorder.

Case 14.—A. B—, æt. 8, male, admitted Nov. 15th, 1867. His mother states that when born he was small and delicate, and was unable to walk until he was 4 years old. After he began to walk he used to suffer much pain in his lower limbs from the exertion. One of his uncles died of brain fever, his father died suddenly at æt. 42, an aunt has asthma. About 3 weeks ago he had a rash all over him for 4 or 5 days, and at the same time he had several red spots of the size of a pea, painful to the touch, which only lasted 2 days. Slight pain in head was then present, but it has become very acute during the last 2 days and nights, preventing sleep. The pain comes on in fits pretty frequently as it seems, he asks his mother to press his forehead, and puts his hand to the middle of it when asked to point out where his pain is. Expression frowning and anxious. No strabismus. No tache meningitique. No discharge from ears. No deafness, is distressed by any noise. No intolerance of light. Belly caved in, flaccid. Has been sick repeatedly during the last week, vomiting. Pupils equal, rather large. Tongue rather red, with thin whity coating. Temperature 101°. Pulse 80. Broth diet. Pot. Iod. gr. iiss + Aq. ℥ss *ter die.* The next day he was free from pain, Tr. Cinchon. ʒss was added to each dose, and a pint of milk and egg to his diet. The day following he was very restless, had been sick during the night, complained much of thirst, perspired much in morning. No pain in head complained of. Wishes for meat and potatoes. From this time he improved steadily, taking after 19th Bark alone and Ol. Morrh., and was discharged Dec. 4th. The symptoms in this child looked rather threatening at first; vomiting without notable stomach disorder, intolerance of sound, anxious frowning expression, thirst, elevated temperature, a shrunken abdomen, and a rather (for a child) infrequent pulse might have led to a diagnosis of tubercular meningitis, especially as the child had always been weakly. There were, however, no certain signs of brain mischief, the headache was frontal, the previous eruption was rather suggestive of rheumatism (erythema nodos. ?), depletion was evidently undesirable, and a treatment directed against rheumatic neuralgia soon removed all doubt.

---

[1] 'Stomach and Renal Diseases,' p. 81.

Case 15.—C——, æt. 40, seen April 19th, 1864. Ill 18 months with pain all over head attended with great soreness, can hardly lay his head on the pillow at night; the pain extends down neck into both shoulders. The worst of the pain is at a spot on each side of the posterior part of the vertex, but the pain shoots all over the head and into the eyes, and often extends to the jaws. He would sleep at night but for the soreness of head which wakes him up every 15 or 20 minutes. He feels very weak, and has lost flesh wonderfully. Perspires very much, especially in bed. Lung and heart sounds normal. No bad teeth. Two years ago a lot of bricks fell upon him and broke some ribs, after which he had rheumatism. Has now a good deal of rheumatism in shoulders and neck, and some in loins. Has had chancres, and suppurating buboes; there are two cicatrices on the penis. No sore throat of any moment, no eruption. Appetite not good. Tongue coated. Bad cough. ℞ Potass. Iodidi gr. 8 + Ammon. Carb. gr. 4 + Tr. Cinch. flav. ʒj + Infus. Cascarill. ℥j *ter die.* Linim. Belladon. On 23rd there was improvement, and Ol. Morrh. ʒij *bis die* was ordered. By May 10th he could lay his head down comfortably, slept much better, and had gained flesh, but there was some tendency to return of pain. I saw no more of him then until the end of December, 1865, when he came to me with an indurated sore on the glans and non-suppurating glands in the groin. This disorder was of recent origin, and had been communicated to his wife very speedily. Had it not been for this subsequent piece of evidence I should have remained in much uncertainty whether the cephalalgia of the previous year had been of rheumatic or syphilitic nature. The previous chancres having been soft ones and this being hard makes it improbable that syphilis existed on the first occasion. This is further established by the absence of secondary symptoms.

Case 16.—Mrs. T—, æt. 74, seen Feb. 13th, 1866. Has been suffering 9 months with her head, seems much depressed. Does not seem fussy, manner rather stern and collected. Is attacked at irregular times with giddiness, often attended with a peculiar sensation in the eyes. Has more stupor than pain in the head, but on 10th had dreadful pain in the forehead near the right temple, lasting all night. When dozing off to sleep sometimes is aroused by a feeling of explosion in the head. Head does not usually feel hot. The disorder is attended with a dreadful sense of restlessness in the head, and indeed all over the body. When she experiences stiffness in her shoulders in the morning she knows she will suffer with her head all day, and on such days she cannot read or do anything or look at anything. Her well days are few in comparison to her bad days. No paralysis of limbs, but does not always feel the ground quite well with her left foot. Touching the back of a chair with her shoulder will sometimes cause a peculiar cerebral derangement—a sudden start in the head. Lungs and heart fairly sound. Urine is clear, more copious at the time of the attacks. Is deaf in left ear, the membrana tympani appears opaque. Meatuses are clear of wax. Has suffered a good deal from rheumatism; had rheumatic fever 10 years ago. During the attacks of giddiness she is afraid to sleep, sees all manner of things before her eyes. She was treated with Potass. Iodid. gr. iv—vi with Carbonate of Ammonia and Soda, Valerian and Bark, and with Ol. Morrh. My last report of her was in December of the same year that she had got very much better. There can be no doubt, I think, that this was a case of rheumatic disorder, affecting both the brain and its coverings. The giddiness, stupor, restlessness, illusions are signs of derangement of nervous centres, while the pain and stiffness point to a like state of peripheral nerves. The result of treatment was, on the whole, satisfactory. In an aged person rapid improvement can hardly be looked for, the recuperative power is failing and feeble.

Case 17.—W—, æt. 36, married, seen June 10th, 1865. Has been suffering a month with his head, has been married 3½ months. The actual pain is felt at the top and back, is worse at night, has not been relieved by treatment, came on gradually. Head is not tender. Taking wine or ale, or even meat makes the pain worse. His memory is not impaired, but he is unable to work from feeling weak. His eyes cannot bear the light well. Forehead cool. Pulse weakish, quiet. Tongue clean, indented. Bowels costive. Is not gouty, nor his family. Had sores on the penis some years ago, but no buboes, or secondary affections. Posterior cervical glands not enlarged. No marked cicatrices on penis. Thinking the disorder syphilitic I prescribed Potass. Iodidi gr. 8 + Ammon. Carb. gr. iv in infusion of Gentian, which he took for 6 days, but I had to give him Indian hemp and Musk besides to procure sleep. June 16th.—He stated that the pain was always worse when he wanted food, and as there was no well-marked benefit from the Iodide I concluded that the pain was rather the result of exhaustion, and ordered him Strychnia gr. $\frac{1}{20}$ with Nitric acid *ter die*, and good beef tea and Burgundy at night. In 8 days he was materially improved, had better nights. He continued his mixture, with Ol. Morrh. ʒj *ter die* until 29th. Three days before he told me that his left hand got very weak, he could hardly raise it to his head, he fainted soon after and was quite unable to stand. He soon recovered, but since then has felt weak in the left arm and leg, has no pain in the head, only a peculiar swimming sensation. He grasped my hand with his left powerfully and walked well. His nights had been very good. Pulse languid and weak. Urine copious and pale. Head not tender and cool. His eyes were clear, but lustreless, and his face sunken. I ordered Ammon. Carb. gr. v + Tr. Cinchon. ʒj + Tr. Valerian ʒj + Inf. Valerian ℥iss *ter die*. July 10th.—Reported quite well. 24th.—Remains quite well. So far, then, I felt satisfied that the headache was not of syphilitic origin, but in December, 1867, I saw him again with an unquestionable syphilitic sore on his right leg. This was one of several which had begun to form since June, 1866, and had healed (save this one) under mild mercurial treatment. I gave Bark, Ammonia, and Pot. Iodid., and it was well by the end of the year. In August, 1868, he was attacked with left hemiplegia, followed by recurring giddiness, which I fear persist. His wife and one if not two children are quite well. The subsequent history goes far to show that the view originally taken was right, and that the temporary success of non-specific treatment must not be relied on too absolutely in diagnosis. The recurrence of hemiplegia on the same side as was first attacked for a short while, and after an interval of more than 3 years is remarkable. I think it is utterly unlikely that the taint was contracted subsequent to the headache. The moral of the case is, caution in pronouncing on the nature of head symptoms, even though there be no appearance at the time of constitutional syphilis.

The next case is one of great interest, but also of great obscurity.

Case 18.—Mrs. H—, æt. 67, seen October 5th, 1868. Suffering as now 3 weeks, has got worse. The whole of her head is in pain, sometimes it feels on fire, sometimes pain darts through her brain. Head is not hot, there is no fever. No sleep since she has been ill. Some years ago she had very fœtid discharge from the left nostril, and some pieces of bone came away. She got well with Pot. Iod., mercurial inunction, and injection of Liq. Sod. Chlorin. This time she has taken the Iodide in gr. v doses without advantage, and mercurial ointment appeared to aggravate the pain. There is an indeterminate eruption on the right lower leg. Her husband is separated from her, he was gay, and infection seems to be admitted, but there is no disease of throat or eruption except on the leg. She remained under my observation till December 25th, when she died. Ten grain doses of Pot. Iodid., with Ammon.

Carb. were given, mercurials employed by the mouth and by inunction, and a fair trial given to quinine, but the only remedies which really were useful were repeated blistering of the shaven scalp, and opium, of which she took 1, 2, or 3 grains daily. Sickness of the stomach was rather frequent, and evidently was not dependent on gastric disorder. The bowels were costive, but were kept open without much difficulty. She had cataract in the right eye of long standing, but about November 18th she became rather suddenly quite blind, so as to lose all perception of light. This continued to the last, and she also became very deaf, giddy, stupid, and forgetful. There was no motor paralysis of any part. Her pulse was always good, about 90. A small quasi gummatous deposit existed for some time at the posterior part of the tongue. On Christmas day, about 5 p.m., she was taken much worse, had vomiting and purging, and about 10 p.m. fell into a state of collapse after having suddenly started up and exclaimed that she had extreme pain in the head. With much difficulty she was got into bed, and some 15 minutes after the seizure I found her still vomiting, her face pale and sunken, and coldish. Her pulse was distinct, and soon became rather strong and full; she remained quite or almost quite insensible, and died about 1 p.m. Nothing was done except to apply a sinapism to the epigastrium. No mercurial had been administered during the last 2 days. The autopsy showed a bloodless scalp, a dense heavy skull-cap, with remarkably evident vascular grooves, and the dura mater firmly adhering, and thickened at a larger patch near the posterior vertex. The pericranium was not thickened, but separated very readily from the right postero-lateral part of the vertex. The brain was wet, but quite free from any lesion discoverable by the unaided eye in every part. The tubercula quadrigemina and optic nerves appeared normal No trace of extravasation anywhere. The internal carotid and vertebral arteries had their walls thickened, chiefly as it seemed by hypertrophy of their outer coat, but their channels were not notably obstructed. Microscopic examination of the vessels detected nothing evidently morbid. At the base of the cranium in each mid-fossa there was a blunt-pointed very remarkable prominence exactly symmetrical. This was the most striking morbid change. I believe the disease was osteo-sclerosis, of syphilitic origin, and suppose that the pain was caused by compression and irritation of minute nerve filaments ramifying in the bone. A case resembling this a good deal, except in the absence of a syphilitic history, has been now several years under my observation. The female, æt. about 35, suffers severe pain, attended with extreme tenderness, either about the right forehead, or the left occiput, which has not been materially relieved by any internal remedies, except Opium injected subcutaneously, though blisters externally have been of great service. There is an affinity, I believe, between cases of this kind and those noticed by Abercrombie under the head of affections of the pericranium, p. 191—198.

LEEDS SCHOOL OF MEDICINE

CHAPTER XXIII.

VERTIGO.

Vertigo, like headache, is but a symptom. Yet it is often so predominant, and represents by itself so much the results of the morbid action, that it well deserves special notice. Its seat, as we have already remarked, is not in the hemispheres, but in the pons, tubercular quadrigemina, or some adjacent parts. This statement may be disputed, and it may be said that lesions of the hemispheres may cause severe giddiness, which may be absent in lesions of the pons. This is true, but it does not appear to me at all necessary that the lesion should occupy the part whose derangement conditionates giddiness. The converse may afford a more favorable condition. The very circumstance of its tissue being damaged by a tumour, &c., may unfit it for producing this special mode of disorder, and irritation propagated to it from some adjacent part may be much more effectual.

Like most other neuroses, vertigo may be produced by primary changes in the encephalon itself, or secondarily by remote irritation. We thus make two principal groups, under each of which we may notice, and afterwards illustrate, sundry operating causes.

Under the first we place (1) *Hyperæmia,* understanding by this term not passive congestion, but increase in the amount of blood traversing the brain in a given time. Andral mentions the case of a woman who ceased to menstruate at æt. 47, became then very fat, and was troubled with constant giddiness of the head. Four years after she had a slight apoplectic attack, and 4 years still later another which proved fatal. Extravasated blood was found in the brain, and the walls of the left ventricle were remarkably hypertrophied. Cases (1) and (2) may be referred to as further illustrations. (2) *Anæmia,* as in impending syncope. In chronic cases, however, the effect is not very constant; I have notes of some in whom headache was a much more notable symptom than vertigo. No doubt exists, however, that this may be a very efficient cause.

(3) *Sudden diminution of intra-cranial pressure,* as is shown by Cruveilhier's experiments. He states that if in a dog the sheath of the dura mater is punctured between the atlas and the occipital bone, and the spinal fluid allowed to escape, the animal reels about like a drunken man, and lies down for hours in a state of stupor, but the day following is quite recovered. Probably the giddiness which we experience on rising quickly, after having been stooping down for some time, depends in great measure on the reflux of the sub-arachnoid fluid towards the spinal cavity, which, while the head was depressed, gravitated towards the cranial. It is worth observing that the giddiness does not occur while the pressure is increasing, but when it is diminished. I can hardly, however, attribute great importance to this condition in states of disease, for it is not uncommon to see patients greatly debilitated in whom the blood-pressure must be greatly diminished without any notable vertigo. This is certainly observable in cases of cholera.

(4) The most efficient causes by far are those which enfeeble and derange the nervous influence, or, if we prefer it, the molecular condition of certain sets of nerve-cells. These are very numerous; the majority may be ranked as of the nature of toxic agents, others as traumatic lesions, others as immaterial influences. Familiar instances of the first group in action are afforded by the vertiginous effects of excess of alcohol, of febrile miasms, of poisonous gases. Among febrile miasms, the *cause of Influenza* holds a "bad pre-eminence." It is very remarkable in this malady how suddenly and severely the cerebral affection supervenes, and how long it continues. In the case recorded at p. 104, it was weeks before the patient could move his head as usual without feeling dizzy. Dr. Falconer says "of the epidemic of 1803, that vertigo, and that to a considerable degree, was in some persons one of the first signs of the disease, and in several instances very alarming and distressful. I saw a lady affected to such a degree as not to be able to raise her head from the pillow without losing all sense, and to whom all objects appeared thrice multiplied; and these uncouth symptoms continued 4 days in their full extent. I observed in several persons that, where the vertigo was most troublesome, and appeared early in the disease, the peripneumonic symptoms were but light, and *vice versâ.* Two of the worst cases of the peripneumonic kind that I saw were not

attended with any symptoms of vertigo. Those who were affected with vertigo even to a less degree than in the case above described were nevertheless unable to read a letter or a few lines in a book; and in several a degree of delirium took place during the night, but not to any violent degree." ('Ann. of Infl.,' p. 254, Syd. Soc.) The intimate affinity between giddiness and headache is very frequently exhibited in these and like instances. The same morbid agency evidently gives rise to both, and the supposition seems very reasonable that the difference between them is rather a matter of situation than of peculiarity of process. This view seems to me very accordant with the following history:

Case 1.—J. S—, tall and spare, of mid age. Has much anxiety, and is overworked in his profession. His disorder seems to have commenced with severe retching, which came on one night when he had been called up to attend a case of some urgency. He is perfectly temperate, but was obliged to take brandy before he could attend to the patient. The last few days he has had distressing vertigo, does not feel safe on his legs; is sometimes obliged to take hold of something to support himself, and found it difficult to remain in church the other day from this cause. Head rather hot. Pulse of fair strength. Stomach right. Bowels open. Tongue clean. The following day he was exceedingly giddy, and vomited repeatedly. While he lay down these symptoms subsided, but recurred as soon as he began to move about. He took 3 grains of Calomel, and began Strychnia. The next day he felt much better, and was eating well. Three or four days later the giddiness continued to some extent; he had brought up some intensely acid fluid in the course of the previous night. His left eyelid was inclined to droop. A mild dose of Pil. Hydr. Colchicum and Aloes was advised. That day he had much fatigue. The next morning he was worse than ever, with a regular brow-ague, sick headache, vomiting, and extreme giddiness. On account of the hemicrania he resorted to Quinine gr. ij, *ter die.* He felt better after the first dose, and the following morning was quite free from giddiness, in fact he was well. The hemicrania was on the right side.

There can be no doubt, I think, that the giddiness, the headache, the neuralgia were all the results of the same morbid action, seeing they yielded to the same remedy. In different situations, however, the manifestations were necessarily dissimilar. Where neuralgia is present quinine is probably preferable, but where the vertigo exists alone or is associated with internal headache, and the condition implies nerve exhaustion, I have much confidence in Strychnia. Case 2 is an example.

The following history which Trousseau relates ('Cliniq. Med.,' Vol. III, p. 6) under the head of gastric vertigo seems to me to belong more properly to that depending on debility, however produced, and so may properly be cited here.

Case 2.—A lady of a certain age sought advice on account of a vertigo which had tormented her several months, and scarcely left her free a minute. It occurred on the most trifling occasion, and was so severe as to induce a degree of syncope, which obliged her to remain in the recumbent position. The turmoil of the street, the sight of persons passing before her, a carriage moving rapidly, brought on giddiness to such an extent that before long she dared not leave her room. She thought herself menaced by apoplexy, and her fears were augmented by her friends, whose officious advice seems to have been tendered pretty freely. To avoid cerebral congestion she confined herself to a strict diet, consisting only of soups and broths, for fear of augmenting the quantity of her blood. Her appetite had fallen off, but her digestion had never been deranged. The regimen she had adopted reduced her to a deplorable condition of cachexia. She was so emaciated and her skin so yellowish that M. Lasègue on first seeing her thought she must be suffering from cancer, but soon came to the conclusion that the vertigo depended on derangement of the nutritive functions, which was exaggerated by the abstinence. Trousseau formed the same opinion, and the result of a tonic medication and good diet speedily proved its correctness. The vertigo soon disappeared, and in six or seven weeks the patient had regained health and flesh.

Trousseau adds in the way of comment that vertigo is often met with in persons whose digestion is perfect, who have a good appetite, regular stools, no acid eructations; yet remedies directed against dyspepsia are successful. He suspects, however, that these remedies may, unknown to him, have acted on the nervous system. In this I very much agree, and have little doubt that just as there are sick headaches in which the stomach derangement is secondary, so there are vertigos in which the same result occurs. Case 3 is an example.

Injuries to the head often produce giddiness, sometimes abiding and severe. When this is the case there is reason to apprehend that some inflammatory alteration of the brain or dura mater or some extravasation of blood has taken place issuing in the production of the so-called hæmatomata, or some small endostosis may have been formed, or portion of bone depressed. In such instances the disorder is, strictly speaking, due to remote irritation, but we may advert to them here for convenience sake. Counter-irritation to the scalp, or an incision made to suppurate, is often of great service. In other instances giddiness and headache may recur off and on for a long time, yet, as the result seems to show, without much more than molecular derangement of the nervous tissue, which subsides spontaneously or with the aid of remedies. It is probable that in most cases of injury there exists more or less of both kinds of alteration; in the graver, however, the visible lesions predominate. Instances are, however, recorded which show how very grave may be the results of an injury which produces no evident lesion. Illustrations of the effects of injuries will be found in cases 4, 5, and 6.

Immaterial influences causing vertigo are chiefly mental, visual, and motorial, and heat. Of the former we have an instance when a mountaineer pauses, "overcome by giddiness," in the midst of some *mauvais pas*. It is not the altered visual impressions alone which affect him, for these have been the same for some good while previously, but the mental action, which till then sustained the other centres, begins to flag, and he turns giddy. It is interesting to read the experiences of strong-brained men in like circumstances. Professor Tyndal says of himself, while traversing the sèracs of the Glacier du Géant, "Once or twice while standing on the summit of a peak of ice, and looking at the pits and chasms beneath me, at the distance through which we had hewn our way, and at the work still to be accomplished, I experienced an incipient flush of terror. But this was immediately drowned in action. Indeed the case was so bad, the necessity for exertion so paramount, that the will acquired an energy almost desperate, and crushed all terrors in the bud." Here we have a rising emotion, a manifestation of weakness, controlled and put down by the superior volitional rule.

The "loci" of the emotions and of vertigo are, if not identical, certainly not remote, and that a fearless mind can prevent the development of one and the other can hardly be doubted. Somnambulists have traversed perilous passages in perfect safety, which unquestionably they would not have faced when their brain was in its waking consciousness. The controlling power of one centre over another, as well as the disturbing power, seems to me to involve a transfer of nerve-force, or something equivalent to it, from one to the other.

The influence of *visual impressions* in causing vertigo is exhibited when we become giddy on looking down from a great height, whence we have not a distinct perception of the objects below, or when we look at a rapidly flowing stream while wading across it. Mayo says, "We lean upon our eyesight as upon crutches," and if we cannot lean securely we become giddy. The tendency to vertigo from this cause is very much a matter of idiosyncrasy, and it does not at all follow that it is greater in the weakly nerved than in the stronger. At the same time there is no doubt that this tendency may be greatly increased by injury to the brain. The following is a good instance. A gentleman had been accustomed for many years to walk fearlessly along planks on high scaffolds, but after a heavy fall on the back of his head and spine giddiness, loss of memory (partial), and other cerebral symptoms supervened, and he found himself at last quite incapable of approaching the margin of any steep bank though protected by a rail without experiencing great uneasiness.

The influence of *movement* is best shown in the effect of turning round rapidly when the eyes are blindfolded. All visual impressions are then excluded, but nevertheless we become very giddy. This result makes it tolerably certain that when the same movement is performed with our eyes open the resulting vertigo is not the result of the unusual visual impressions. Purkinje's conclusion appears to me most probable, that the rotatory movement gives to the particles of the brain the same tendencies to particular motions as the particles of a revolving disc receive, and that this disturbance of their state of rest is manifested by the apparent movements of vertigo. The effect produced by movement is greatly augmented by the existense of nerve debility. Giddiness may then be produced by any quick movement of the head.

Heat acts in causing Vertigo much like other causes of a debilitating nature, generating an unsteady disorderly action of the grey matter of the mesocephale. In a case of severe heat-stroke under my care it has recurred at intervals for many years, sometimes with great intensity. Any exertion or any attempt at reading is apt to bring it on. Wine has relieved it. It is associated with great deafness, but is hardly, I think, dependent on it.

The vertigo which occurs in certain cases of Epilepsy may properly be noticed here. It is quite distinct from attacks of "petit mal," lasts much longer, and is not attended with notable loss of consciousness. It seems to be a mode of Epileptic manifestation of a milder kind than the convulsive paroxysm. It is sometimes brought on immediately by turning round. In one patient it lasted three or four days and nights continuously at the earlier period of her illness, and it was stated that the head got very hot when the giddiness came on.

Toxic matters in the blood may conditionate vertigo. Trousseau cites from a commentator on Boerhaave the case of a man who, during two years, was attacked with giddiness whenever he attempted to stand upright. The most skilful practitioners failed to relieve him. All at once he had an attack of gout, from which he had never suffered before, and from that time he was freed from this troublesome vertigo.

The causes which produce vertigo by setting up remote (more or less) irritation may be very numerous, but we need notice no others than disease of the ears, ocular - tænia, and gastric derangement.

According to Trousseau, Menière was the first to make known the fact that inflammation of the internal ear was liable to give rise not only to complete deafness, but to vertigo, unsteady gait, rotatory motion and falling—these symptoms being attended with nausea, vomiting, and sometimes with syncope. He found that after a variable time these phenomena disappeared, the deafness remaining permanent. In one instance where an autopsy was made the brain, cerebellum, and spinal cord were found perfectly normal, but the semicircular canals were filled with a reddish plastic lymph, replacing the liquor Cotunnii. The patient was a young female who, after exposure to severe cold at the time of her catamenia, became suddenly and completely deaf, and had continual vertigo; the least exertion caused vomiting, and death occurred on the 5th day. Triquet makes special mention of giddiness and nausea occurring in cases of otitis of the labyrinth. Burggraeve relates that he himself suffered from internal otitis with perforation of the membrana tympani, and escape of sanguinolent pus from the meatus. The flow of pus ceased, and then came on frequent and severe attacks of giddiness, nausea, vomiting and failure of power in the lower limbs. Turning round abruptly or blowing his nose caused him to fall instantly. The upper limbs were not all affected, nor was there any impairment of the function of the brain or of the senses. Even the hearing was perfect with the exception of an inconvenient humming and hissing in the diseased ear. Hillairet relates a very similar instance. Brown-Séquard states that in mammals the least puncture of the auditory nerve causes rolling, just as after the irritation of the crura cerebelli.

Dr. Heslop ('Dub. Med. Journ.,' 1859, May, Aug.) describes the giddiness produced by tænia as so severe that the patient often staggers about like one intoxicated, and even when the disorder is milder there is almost continuously a sense of confusion and insecurity, which renders walking a serious effort. It seems to me very interesting to find the same cause giving rise to two conditions, so diverse apparently as paroxysmal convulsion with unconsciousness, and continuous giddiness with headache. Is not this a striking instance of the important differences subsisting between frames that we are too ready to regard as identical? The theory that regards remote irritation as causing disorders of nervous centres by giving rise to arterial constriction and anæmia, or the theory which substitutes embolism for arterial constriction, seem to me to make no advance in explaining these remarkable peculiarities of morbid action, as one can hardly understand how anæmia is to produce such very dissimilar phenomena. For myself I believe it is better to admit that the nerve-cells like the nerve-fibres may be thrown into different morbid states varying more or less widely, but often passing by gradation into each other.

Gastric vertigo is not in my experience a very common affection. Certainly, considering the extreme frequency of gastric catarrh, and the by no means rare occurrence of gastric ulcer, it is a matter of surprise to me that we do not meet with it more frequently. Disordered stomachs and feeble and weary brains would seem to afford the most favorable conditions for the generation of this neurosis, yet they do not seem *per se* sufficient. However, there is no doubt that cases of this kind will occur now and then to every practitioner, and the two following histories will serve as a description.

Case 3.—A gentleman, æt. 46, after breakfasting on coffee, bread and butter, and some beef, began very soon to feel giddy, and the giddiness increased after he went to church. He had some nausea, but the giddiness was much the most prominent symptom. His head was rather warm. The giddiness increasing, he was obliged to come out of church, and walked home (a short half mile) slowly and totteringly. Soon after reaching home he was very sick, and brought up his food and a quantity of yellowish mucous fluid. Immediately after this the giddiness lessened and soon was gone. Two hours later he was able to take food. The cause of the gastric disorder in this instance was obscure. No other members of the family suffered, though there is little doubt they had taken the same fare. Sometimes regurgitation of bile into the stomach appears to be the cause of offence. An eminent Indian physician related to me that he had twice had giddiness of the most severe kind, the room appearing to whirl round violently first one way and then the opposite, and that this continued some hours, until he vomited some morbid bile. While the giddiness continued he had no pain, but fruitless retching.

These are acute cases; the following, related by Trousseau, is more chronic.

Case 4.—A magistrate, æt. 60, had impaired his digestion by hard work, accomplished mostly after dinner. His food lay heavy at his stomach, he had acid eructations, and his appetite failed more and more. All at once, while looking up to the ceiling, he fell violently giddy, saw objects turning round him, and experienced nausea. Feeling uneasy, he sent for his physician, who purged him and gave him mustard pediluvia. The disorder increased rapidly. Vertigo was present, not only when the patient was standing or seated, but also when he was in bed. Nausea became incessant, and was compared to sea-sickness. His uneasiness was extreme, he thought himself threatened with apoplexy, some of his medical attendants suspected that ramollissement was in progress. Trousseau, viewing it as a gastric affection, prescribed bitters and alkalies, and all the symptoms vanished in 15 days. Some weeks later they returned, and were again banished by the same remedies.

Dr. Buzzard relates ('Brit. Med. Journ.,' 1868, Dec. 19th) an excellent instance of the same kind, in which, however, the attacks were more paroxysmal, occurring about every 10 days or oftener, and lasting half an hour to 2 or 3 hours. He sometimes retched, but never vomited. There was some noise in the ears, and occasionally twinkling lights before his eyes. Potass. Bicarb. gr. x—v, with Pot. Iod. gr. i + Ferri Tartarati, gr. i proved curative. Dr. Buzzard thinks that such symptoms are not at all uncommon, especially among professional men with much mental labour. He considers that the nervous system in such patients is in a faulty condition, closely allied to the epileptic. It is important not to mistake such giddiness as this for that depending on hyperæmia, and to commit the error of leeching the head, which Trousseau laments as too common. Bretonneau's treatment, which Trousseau adopts, consists in a cup of quassia infusion every morning, and a powder composed of Bicarb. Sodæ gr. v + Cretæ pptæ. gr. x + Magnesiæ gr. v, to be taken at bedtime, and after each of the two principal meals. After 5 or 6 days alkaline mineral waters, ferruginous or not, are to be substituted for the powders, which may again be resumed 8 or 10 days later. He also recommends nux vomica, but above all insists on the necessity of a tonic and substantial regimen aided by moderate exercise.

Case 5.—W. F—, æt. 49, stableman, seen August 15th, 1865. He had typhus when young, but no other illnesses except falls, in which he seems to have hurt his head a good many times. The bone is indented notably at the upper and fore part of his head towards the right side, but the part is not tender. Syphilis denied, and there are no indications of it. Is not affected by heat or by cold, can expose his bare head to the sun without suffering. Eleven years ago he had an epileptic fit for the first time, or rather several, which continued to recur for 3 weeks in spite of leeching, cold to the head, and purging, and Pot. Iod., and subsequently cupping. He was then bled, after which he rapidly and completely recovered. Since then he has had several attacks of severe vertigo, with such muscular weakness as to compel him to give up work. On each occasion his tongue has been moderately clean, pulse between 60 and 70, decidedly soft, and not filling out the artery, skin pale, cool, and moist; eyes not injected, no heat of head, no thirst. Each time Dr. Palmer, whose patient he was, tried all he could to avoid V.S., purged him freely, applied cold to the head, cupped him once, forbade stimulants (which, he says, make him worse), but has each time been compelled to bleed. The last time his pulse was stronger and fuller two days after the blood-letting than it had been for days before. At my interview I observed that his lips were pallid, his pulse 75, of good size and force, his head cool, not tender; it felt as if it did not belong to him, appetite good, tongue clean. The giddiness, he stated, came on all at once, and lasted (till he was bled) for weeks, with intervals of comparative amendment. When the giddiness was upon him he was unable to lie down, but could at other times. No nausea. No worms. He is obliged to be careful in what he drinks; cannot take much beer. August 17th.—He was more giddy, "just the same as a drunken man." The giddiness was made much more severe by pressure on the carotids, which caused the frontal veins to swell. No undue pulsation of cervical or temporal arteries. He was now bled to 16 ounces, as he had been before, felt better in an hour, and the next day was nearly well, and returning to work. September 15th.—The giddiness returned very severely, but was soon dispelled by Pulv. Colchici gr. v *ter die*. His pulse, I was informed, was fuller and stronger after he had taken the Colchicum than it had ever been before. 1866, January 3rd.—Has remained well with the exception of one attack, brought on by drinking, and which ceased after purgation. 1867, December 5th.—Has remained quite well up to the present date. Urine not albuminous. He remained well until August 9th, 1868, when he complained of much giddiness and general severe headache, staggered about as he walked. Skin cool. Pulse very weak. A calomel purge, cold affusion, and colchicum, with some other means, were employed without much benefit until 21st, when 15 ounces of blood was taken in a good stream. He declared himself better immediately, and in 24 hours felt free from every symptom, except a little weakness; returned to work in a day or two.

I do not quite satisfactorily explain to myself the pathological condition of this patient. His encephalon was probably irritated by some depressed bone or other result of bypast injury, but I cannot doubt that hyperæmia of some intra-cranial centre was essentially concerned in causing the disorder. Yet it seems remarkable that the pulse should have become decidedly fuller and stronger after the depletion and colchicum than it was before. Stimulants were injurious, and V.S. remedial; and this does seem conclusive against viewing the disorder as one of debility. The heart was sound, so that we cannot ascribe the good effects of bleeding to its having relieved an oppressed right auricle and ventricle. The most probable view is, I think, that hyperæmia of the vagal nuclei in the medulla oblongata, and of some adjacent parts, both conditionated vertigo, and caused depression of the heart's action by undue stimulation of the cardiac branches of the pneumogastric.

Case 6.—E. W—, æt. 48, conductor, admitted September 15th. Ill 4 days with giddiness and headache; could hardly stand this morning. Has not the least pain in head, but it feels light; he can hardly see anything. Is not anæmic. Says he is a strong man; never ailed with his head till a month ago. Never drank to excess, but left off taking alcoholic liquor three months ago. With strychnia he improved very much, in fact quite recovered.

Case 7.—Mrs. ——, æt. 45, has suffered from menorrhagia the last few months; the flow does not last longer than is normal, but is excessive, and weakens her much. She was as well as usual, and going about her avocations on 8th, and slept well, but on the following morning was suddenly attacked with extreme prostration, faintness, and giddiness, before leaving her bed, and with extreme irritability of stomach, so that everything was rejected, and she continued to retch even when the stomach was empty. The giddiness is so intense that she frequently almost loses consciousness; it is especially felt when she turns her head to the left. Has some aching pain in limbs. No fever. Tongue nearly natural. I discouraged any medicine being given, but desired that she might be fed with teaspoonfuls of Brandy and Milk every 20 minutes. She rejected the first two or three, but retained the rest. The dose was gradually increased to one and two tablespoonfuls, and by the next morning she was out of all difficulty. The actual cause of the symptoms in these two cases is obscure. Influenza seems to me the most probable, especially in the last, on account of the suddenness with which the disorder commenced.

Case 8.—W. S—, æt. 62, fell on evening of December 22nd, and bruised the back of his head and his loins severely. He was stunned at the time, but was able to walk slowly a short distance about 2 hours after. Giddiness first came on January 8th, while he was out of doors; it was severe, and he had to support himself by clinging to an adjacent wall. It lasted about two minutes. He had never felt giddy in his life before. The giddiness has continued to recur at uncertain periods for the last 2 years; he may be free for a month, or may have it twice a week. Loss of memory (partial) and other cerebral symptoms have also ensued, so that he has been obliged to abandon his profession. The chief points of remark are the non-supervention of the giddiness until the 17th day after the accident, and its intermittent character, although several of the other symptoms were continuous. He is a man of firm, strong, compact make.

Case 9.—J. P—, æt. 43, seen January 9th, has been employed in making tunnels. Is of short, robust make. Used to drink to excess spirits and beer, but has not the last 4 years. About that time some bricks fell on him in a tunnel, and injured the upper part of his head; the scars of the wounds in the scalp are evident. He was insensible for some days after the accident. Ever since that time he has been subject to giddiness, so severe that he is afraid to cross the street, or go by a big window for fear of tumbling through it, and is unable to work. The upper part of his head and the right temple are very tender to pressure. Now and then has had pain in the head, which he compares to a feeling as if the top of his head were being lifted off; it causes some nausea. His appetite is good, he enjoys his food, but sometimes after eating the giddiness is aggravated, and he feels as if he would pitch down head foremost. Pulse 84, weak. Has had ague and clap, with buboes, 25 years ago, but no syphilis. Repeated blistering to the head was employed with the most marked benefit On February 24th he had no pain in the head, no giddiness, only felt weak. The giddiness had been absent 3 weeks. He returned to work. A slight relapse attended. Morning retching was met by another blister to the head successfully, and at the last report, April 17th, he was able to work, and was going on well. Epistaxis had also occurred with much relief.

The cause of the symptoms in this instance is probably some piece of depressed bone acting as an irritant to the membranes of the brain, or it may be that some blood has been extravasated on the surface of the arachnoid, and, remaining as a pseudo-membrane, becomes a cause of disorder, or, as Lancereaux and others maintain, the pseudo-membrane may have been formed by meningitis. How is it to be explained that in cases of this kind Epilepsy is sometimes the result, sometimes continual giddiness? The fact, at any rate, shows that these affections must have a good deal of real affinity to each other, and obliges us, I think, to fall back on the very varying vital peculiarities of the nervous centres in different persons. This certainly is an acknowledgment of ignorance, but it at least saves us from the too common error of tacitly denying such differences.

Case 10.—C. C—, æt. 12, admitted December 11th. Ill since about last June, when he was struck on the back of the head with a cricket bat, and since then has suffered from dizziness and violent headache, not constantly, but at various times, and especially if he exert himself. When he is ill in this way he has repeated vomiting. The attacks last 1 or 2 days. No tenderness of head; pupils active, large; pulse weak; skin cool; sleeps well. He took citrate of quinine and iron, with tinct. of nux vomica, with great benefit. The case is certainly interesting as showing how the dynamical disorder remaining after a concussion may be aggravated by expenditure of the nerve-force, and removed by invigorating treatment.

Giddiness occurring in old persons, together with headache, may be attributed, as Abercrombie's 122nd case renders probable, to extensive ossification of the vessels. I have, however, found that Bichloride of Mercury in cases of this kind is sometimes of great benefit. It can hardly be supposed that it alters the state of the vessels, but it may render the tissue of the brain less liable to derangement. Some reckon the drug as a tonic. Dr. Headland states (v. 'Lancet,' 1866, Vol. I, p. 8) there are symptoms met with in old persons which are often the precursors of apoplexy, and which remind one of those that frequently portend insanity, such as dizziness in the head, confusion of ideas, and general embarrassment of all the mental faculties. These are removed or lessened by ʒss doses of the solution of Bichloride of Mercury (P.L.) given 3 or 4 times a day for 3 or 4 weeks.

CHAPTER XXIV.

NIGHT TERRORS IN CHILDREN.

The condition of sleep is certainly favorable to the occurrence of various disorders chiefly belonging to the family of the neuroses. Even the profuse sweating which attends on phthisis, rachitis, and other maladies in which asthenia is a prominent feature, is often remarkably limited to this period. During the time of sleep repose the system, we may say, is off its guard, and causes which during the waking state produced no considerable effect act with great potency at this opportunity. If this is the case in adults we may believe that it will hold at least equally true in children, especially in such cases as we are considering, since their less powerful reasoning faculties cannot, even when aroused, readily control the derangements of their fancy and imagination. That even adults are not exempt from some degree of 'night-terrors' is notorious to all who have any experience of nightmare, and is well exemplified by the following bit of his personal history which a friend narrated to me. He had been very hard worked for some time, and had besides some commercial anxieties, which, however, did not occupy his mind much during the day. He is perfectly temperate. During the last month he had been sleeping badly, waking up in the night with strange ideas of impending loss of property, for which there was no sufficient ground, and which did not trouble him during the day. A night or two ago he woke up with a strange terror of mice, which possessed him until he jumped out of bed and took a glass of brandy and water, after which he slept well for 5 hours. He got some social recreation soon after this and had no return of the disorder. The very name which is given to the neurosis implies that the emotional centres are disturbed, and it also appears that the intellectual are affected, though not to the same extent. There is, properly speaking, no delirium, but consciousness in some instances seems to be much impaired, the little patients, as their mothers state, being out of their senses, and continuing to scream violently and to tremble for some time after they have awoke. Dr. West states that the attacks are always more or less distinctly associated with the impression of some object which occasions alarm—as a cat or a dog—which is fancied to be on the bed, and this illusion continues even after the child has recognised those around it. The tendency to occur at night, and the partial unconsciousness, indicate a degree of affinity to epileptic seizures, while a relation to hysteria is manifested in the circumstance that a very large amount of aqueous urine is voided as the disorder subsides.

The most practically important points for study are the causative conditions. A weakly, excitable, nervous system, no doubt, strongly predisposes a child to suffer. The existence of some peripheral irritation is usually the direct cause of the attack. Intestinal derangement seems to be the most frequent, but teething and probably other troubles (among which ill-placed pins must not be forgotten) may be equally the culprits. If I do not mistake, obscurely developed remittent fever may manifest itself in a somewhat similar way.

Case i.—W. H. B—, æt. 5, was seen April 1st, 1859. He had been under my care nearly 2 years before with considerable nightly delirium and screaming, and with lameness of the right hip and neuralgic tenderness of both. I was then suspicious of strumous disease of the joint, but neither I nor one of my surgical colleagues could discover sufficient evidence that such existed. He was then treated with quinine in two-grain doses at 7 and 9 p.m., and recovered so far that he slept well, and only halted in walking without having any actual pain in the legs. He had now come into the hospital with manifest hip disease; an ulcer was discharging near the left. While awake in the day he was pretty well, but if he slept, and at night during sleep, he talked wildly and screamed so much as to disturb the other patients considerably. When asked if he was in pain he answered "No," and promised not to scream again. On my advice being asked respecting him I recommended 3 grains of quinine in two doses at 6 and 8 p.m., but after 3 days of this treatment the screaming was even worse. The quinine, however, did not otherwise disagree, so I doubled the dose. From that time he ceased to scream, and slept quietly during the 3 weeks he remained in the hospital. The discharge from the hip also lessened materially, and his general state improved. The necessity of judging correctly the proper dose of the remedy is very apparent in this case.

Another not improbable cause is rheumatism of the head, which was present, I suppose, in the earlier part of the malady in the following instance.

Case 2.—C. P—, æt. 18 months, seen October 3rd. Ill since measles 6 weeks ago; is very irritable, constantly screaming night and day for a fortnight; screams violently now before me. His mother is worn out with him. He only takes breast milk. Is losing flesh; has no fever. Bowels costive, motions green. Urine dark and offensive. Seems thirsty. Has 6 teeth, the last cut 3 months ago. He was ordered Hydr. c. Cretâ gr. ij, *o. n.*, and Ol. Ricini, and Pot. Iodid. gr. 12 + Vini Colch. ♏ 30 + Tr. Opii ♏ 12 + Mist. Potass. Citrat. ℥iss M. ʒj *ter die.* He ceased from the violent screaming in 3 days, and in 10 more was wonderfully better, sleeping at night. A week later the improvement continued, but as there was some diarrhœa Dover's powder with chloric ether in mucilage was ordered, which seemed to tranquillise his nervous system, so that he was reported Nov. 3rd as much more good-tempered. He was doing well when last seen, Dec. 5th. Oleum Morrhuæ was given as well as the mixture the last fortnight. The pathema here was not simply nocturnal, but it is very conceivable that in another similar instance it might be. The aperients were doubtless of service, but I cannot think that the Iodide and Colchicum were useless.

In the following case the cause was probably inflammatory pain in the ear, but it is remarkable, and probably indicative of the neurotic character of the disorder, that the attacks were confined to the night.

Case 3.—P. N—, æt. 5, seen May 11th. Is generally a happy, contented child, but the last 5 weeks has been very irritable and quarrelsome. Has had catarrh over a week, his voice has been hoarse, and he has coughed at night a good deal. On night of 9th he woke up trembling all over and shrieking 'awfully,' so that he might be heard in the next house; this lasted about 5 minutes, during which he appeared terrified—his eyes seemed starting out of his head, and he clung to his mother. All yesterday he was very ill and excitable and languid; had a sinapism to chest, and went to bed early. At 10.30 he woke up, and while quite awake he suddenly became terrified, and began to shriek and tremble violently—clung to the bed-posts with 'enormous' strength. This condition continued for about 20 minutes, during which he was cold, but perspired. His eyes looked wild and terrified, and his face was red. He was conscious and knew his mother. Between the paroxysms of excitement there were intervals of calm for about 5 minutes. When the attacks were over he was perfectly pale. I ordered grey powder and Rhubarb., Pot. Bromidi gr. iv *o. n.*, and Tr. Cinchon. in the day. The next two nights he had no return of the disorder, but the following a worse attack than any previous occurred. Mr. Hinton then saw him and found perforation of the membrana tympani in one ear, which was deaf, and a good deal of inflammation. One leech was applied to the meatus, and he remained free from any relapse when I saw him a week later. In an infant who cannot explain his symptoms it would not be surprising that otalgia should be overlooked, but I think I can be pretty sure that in this instance no complaint was made of any pain in the ear.

In some cases, where the symptoms last for months together without any material change, there exists probably a peculiar state of nervous system similar to that which prevails in epilepsy or asthma.

It is reassuring to the friends to be able to tell them that the attacks in question do not imply actual peril. They are distressing enough at the time, but they are a milder malady than convulsions, and, of course, than any inflammatory or organic lesion.

In an able paper on "Sleeplessness in Infants" (v. 'B. M. J.,' August 28th, 1869) Dr. Eustace Smith has mentioned the following causes, viz. hunger, injudicious feeding, cold feet, hereditary syphilis, worms, habit, and exhaustion of nerve-force. A child may be almost constantly hungry if fed solely from the breast, and obtaining only a scanty supply of watery milk. Injudicious feeding is an excessively common cause, and the nocturnal restlessness and irritability cease at once when it is removed, and the alimentary canal cleared of undigested contents. Cold feet often coincide with griping pains in the belly, and are, I imagine, mostly dependent on the irritation being reflected on their vaso-motor nerves. Nocturnal fretfulness is usually the first sign of hereditary syphilis, and depends, perhaps, on pains in the bones. It yields to a few doses of grey powder. Dr. Smith mentions the case of a child 19 months old, well nourished, who had fits of violent screaming, which began about 8 p.m. and lasted the greater part of the night. They ceased as soon as a purgative of rhubarb and jalap expelled a large quantity of small thread-worms. The habit of waking up in the middle of the night and crying to be fed is to be broken by a little judicious firmness. A young infant who is suckled the last thing at night, say at 10.30, does not need the breast again till 5 or 6 a.m. Sensitive children may easily be made restless at night by injudicious excitement just before being put to bed. It is very apparent how necessary it is to inquire into causes before attempting to remedy their effects. The whole paper from which I have taken these extracts will well repay perusal.

The indications for treatment are—(1) to remove any existing irritation; (2) to calm and soothe the nervous system; (3) to invigorate it. Proper feeding is of the first importance in the case of very young children. Their alimentary canal is sometimes wonderfully capricious, and it is altogether impossible to lay down rules that will suit all cases. I am speaking, of course, of the very common case where the mother cannot suckle her children for more than a very short time. But it occasionally happens, as in an instance I am acquainted with, that the maternal milk disagrees, while other milk is taken well. One infant is suited exactly by Robb's biscuits with milk and water, another by the same without milk, another by milk and sago, while a fourth is dependent upon asses' milk. A lady informed me that one of her children was only reared by giving a teaspoonful of sugar of milk in a pint of milk with Robb's biscuits for food. Neither the milk nor the biscuits would stay on the stomach till the sugar of milk was added. I believe we must be guided mainly by our experience of each individual. Dr. Ringer remarks that hard, shotty, or lumpy motions are almost invariably passed by young children under 6 months when brought up by hand, even though they take only good cows' milk diluted. These scybala consist chiefly of coagulated milk, and the coagulation can be prevented sometimes by the addition of alkalies, carbonate of soda being preferable when the bowels are costive. A little pepsine or pancreatine might probably be serviceable in such cases. Dr. Sieveking mentions that of an infant, 18 months old, where the former was given (gr. v, *bis die*) with a decidedly good effect on the digestion, the motions speedily recovering their healthy appearance when they were out of order and contained undigested matters. Dr. Langdon Down has recently reported the case of a man, æt. 52, who had lost much flesh, become very weak, and passed a large quantity of solid fat by the bowels. He was cured by 7½ grs. of pancreatic extract + as much malt dust, *ter die*. It is probable that the remedy would succeed at least as well with children (v. Rep. Clin. Soc.,' p. 119, 1869). An active purgative, Dr. Ringer says (v. 'Med. Times and Gaz.,' May 4th, 1867), will stop the screaming if the bowels are confined. In weakly children 6 to 9 months old constipation may be overcome by Vini Ferri ʒj + Tr. Rhei ♏6, *ter die*. When it is more a matter of correcting an unhealthy state of alimentary canal than of obviating constipation, small doses of Hydr. c. Cretâ and Dover's powder are beneficial. When any diarrhœa exists I should advise the practitioner not to be too insisting with the mercurial, although the stools may appear very unnatural, but to trust to the sedative, aided, perhaps, by Bismuth.

I am quite sure that stools will become healthy under this management. Citrate of Iron and Quinine will be needed by many of these children as soon as intestinal derangement is removed, and cod-liver oil also. Cold bathing, prudently managed, may do great good, but the application of the cold should be very brief, not more than a momentary douche or dip, and care should be taken that the child is well warmed afterwards. It may be well, as Dr. Ringer advises, to put him back again into his warm bed for a short time after his bath. In cold weather the water should be tepid. As asthmatics find that having lights in their bedroom will immediately relieve (in some) an attack, we may well think that the same means may be of service to children who are threatened with night terrors. Dr. West well says it is downright cruelty to force a timid little child to go to bed in the dark, or lie there without a candle, while its active imagination conjures up out of surrounding objects all sorts of terrific forms.

LEEDS SCHOOL OF MEDICINE

CHAPTER XXV.

SPINAL IRRITATION.

To describe the pathema so named is no easy matter. A definite but too exclusive view is that which Mr. P. Teale and Dr. Favell may be said to take. The latter describes it as a state characterised by morbid sensibility of certain nerves proceeding from the spinal cord, and by a preternatural susceptibility of the cord or its coverings to external impressions—this state depending upon an hyperæmatous condition of the blood-vessels at the origin of the spinal nerves. He bases this view chiefly on these two considerations, viz. the influence of pressure in aggravating the pain, and the effect of treatment by rest in the prone position, cupping and blistering; internal medicines being of no avail, except to open the bowels. Mr. Teale says that "local depletion by leeches, or cupping and counter-irritation, by blisters to the affected portion of the spine, are the principal remedies. A great number of cases will frequently yield to the single application of any of these means. Some cases which have existed several months I have seen perfectly relieved by the single application of a blister to the spine, although the local pains have been ineffectually treated by a variety of remedies for a great length of time." Another definite but opposite view is that taken by Romberg, who calls spinal irritation a 'phantastic caricature,' and says, "If we subtract the spinal pain which accompanies the diseases of various organs, for instance, the stomach or liver, and is increased by internal pressure, and often associated with pain at the epigastrium, the doctrine of spinal irritation is deprived of its entire foundation, and takes its place among those fictions which have always found their way into pathology when physiology was undergoing a revolution." He continues further on, "Both in my private and hospital practice I have subjected the question of spinal irritation to a rigid inquiry, and have arrived at the conclusion that beyond the knowledge of some irradiated sensations and reflex phenomena it has contributed nothing either to physiology or pathology, nor is likely to do so." Yet he seems to admit, on Sir C. Bell's authority, a form of hyperæsthesia of the spinal cord, which may be attended with agonising pain.

The truth, we may suspect, lies between the extremes. The Messrs. Griffin, whose work is written in a most judicious spirit, and is based on a very large experience, affirm decidedly the existence of a morbid state of the cord or its membranes, and the great benefit, sometimes amounting to cure, which may be obtained by local depletion or counter-irritation; but they recognise, also, that spinal tenderness may arise from disorders of various viscera, from worms, miasms in the blood, mental emotions, and the irritation arising from local injury; and they advocate the use of internal remedies, intended either to remove the cause, or to diminish the preternatural sensibility, or to alter the morbid action on which the vicious habit depends. They consider that a disturbed (irritated) state of the cord is one vast source of those complaints called hysterical or nervous. They seem to prefer the expression of 'disorders connected with or attended by spinal tenderness,' rather than that of '*depending on* spinal tenderness,' and they mark the affinity subsisting between these pathemata and hysteria in their non-fatal and non-inflammatory character, their occasional persistency, their occurring in some instances without any spinal tenderness but with all the marks of the hysteric character, and lastly in their tendency to imitate every complaint to which the human frame is liable. This goes some way to justify Romberg's assertion that the "whole range of hysterical and neuralgic affections has been made available to obtain the materials for interpreting, or rather for misinterpreting, this affection."

We have already stated that in such pathemata it is probable that every part of the nerve, from its peripheral termination to its tertiary spinal centre, may suffer, so that on this view the posterior horns of the grey matter in the cord would be engaged in the morbid action as much as the nerve-fibres implanted in them. The nerve may be compared to a wire which vibrates when struck at any part throughout its whole length. There can be little doubt, therefore, that the spinal cord is involved in neuralgic and kindred disorders. But the pith of the matter seems to lie in the solution of this question, To what extent are neuralgic or quasi-hysterical disorders *dependent* on a morbid state of the spinal cord, or of the nerve roots and trunks directly arising from it? We can hardly entertain any idea of deriving any aid in answering this question from physical or anatomical examination. The observation of the effects of remedies, and of certain subjective symptoms, constitutes the only evidence we can appeal to. As to the latter, we find in various recorded cases that pressure on the tender part of the back has aggravated very greatly some peripheral disorder, or called it into noticeable existence. Thus, Messrs. Griffin, in their 84th case, mention that the slightest pressure on the sacrum brought on an instant desire to evacuate the bladder. In their 80th case pressure on the first or second lumbar vertebra brought on pain in the bowels, which usually was associated with diarrhœa. At p. 238 they state that a young gentleman had such extreme sensibility of the spinal column that a slight touch would almost bring on syncope. In the 6th case there was extreme tenderness about the 7th or 8th dorsal vertebra, pressure on which occasioned a darting pain from thence to the sternum, as if he was pierced with a sword. Dr. Radcliffe, in his able article on spinal irritation, relates a case under his own care where pressure on the tender cervical region of the spine brought on or increased headache, and caused a feeling of great nausea and oppression at the precordia. After recovery the same patient suffered again, but the tenderness was low down in the lumbar region, and pressure on the tender part brought on colicky pains in the lower part of the abdomen and a cutting pain in the urethra, with an almost irresistible impulse to pass water then and there.

With regard to these symptoms, it must be observed that we are certainly not justified in making the inference that the spinal cord is specially disordered because pressure on the spinous processes gives rise to pain. All that can be affirmed is that the cutaneous nerves at the part pressed are hyperæsthetic, and it is quite certain that the causes of this hyperæsthesia may be manifold. Dr. Radcliffe affirms it to be the rule that spinal inflammation and congestion, without spinal irritation, are *not* accompanied by spinal tenderness. My own belief is that they are usually so attended unless the nervous tissue is extensively destroyed, but the pain experienced on pressure is not so intense as it often is in hyperæsthesia. Whatever damages nerve-tissue is likely to cause pain, and therefore it is almost unavoidable that it must occur in inflammation of the cord and its membranes, as well as in other instances of impaired nutrition of nerve-tissue. Hasse makes the remark that the spinal region, we know not why, is one of the parts of the body which most readily becomes the seat of pain. Headaches and backaches are among the commonest of nervous troubles, and seem to be produced often in much the same way. Graves makes the remark that a fever patient will sometimes have "got his headache in the small of his back." The Griffins observe "there is no part of the spinal marrow that seems to be the centre of such general sympathy as about the situation of the 8th dorsal vertebra. If a nervous or hysterical woman hears unfortunate news, if the catamenial flow is interrupted, or if the uterine action in advanced pregnancy becomes too powerful for the system, we believe there is no part so readily affected as the centre of the dorsal spine, no complaint so usual as the concomitant pain of stomach." Such being the case, we are not surprised at the frequency of spinal tenderness in cases of neurotic disorder. Given, then, hyperæsthesia of the nerves distributed to the skin covering the spine, we can, without much difficulty, understand how pressure on this part may arouse or intensify peripheral disorder in the viscera or the limbs. What occurs, in fact, is that a reflex morbid sensation is produced through the intermedium of the spinal centres. Just as pressure on an aching tooth will cause pain radiating to remote parts, so is it with the tender spine. The nervous centre is not more concerned in the one case than in the other. Trousseau affirms that in all neuralgias there are at least too painful spots, one the site of the terminal expansion of the nerve, the other that of the spinous process corresponding. The latter is, of course, the cause of the spinal tenderness. It is, however, remarkable that in neuralgia of the fifth nerve tenderness occurs over the first two cervical spines, where no filaments of the nerve are distributed.

As to the argument from counter-irritation and leeching to the tender region of the spine, there seems quite sufficient evidence to prove that very good effects are not rarely produced. Dr. Radcliffe endorses Mr. Teale's recommendation of counter-irritation, and does not dispute that depletion may also be serviceable. The Griffins also approve of the same measures, but regard them as chiefly applicable to cases of a less severe kind, where there is little or no constitutional disturbance, and where the pain is of limited extent in the back and periphery. Leeching alone, they state, may be almost capable of effecting a cure in cases where there exists any puffing of the integuments about the tender vertebræ. They protest, however, against the notion, which they say has become general, that spinal irritation is always to be relieved by local treatment, and they by no means acquiesce in the opinion expressed by some that internal medicines are of no use. They contend that the failure of local remedies is no argument at all against the existence of a morbid state of the cord. This may be admitted, but, of course, where they do not avail we lose all proof from this source.

It being, however, admitted that in some instances great good results from local depletion or counter-irritation, are we entitled to draw the conclusion that in these cases there exists an hyperæmic condition of the cord or its nerve-root? Some might demur to this, but, on the whole, it seems warranted by our general experience of the effects of these means. If the statement were limited to counter-irritation I should feel more doubtful, for it is quite intelligible that this may act beneficially on the nerves of the surface to which it is applied. But if leeches or cupping accomplish a *permanent* relief, there really seems ground to regard the morbid condition as inflammatory. But then the question arises—where is the inflammation? In meningitis and myelitis the symptoms are so different that it seems impossible to consider that the cord or its membranes are affected. The same may be said of so-called spinal congestion, a disorder of whose relation to hyperæmia of any kind I entertain strong doubts. It is not impossible in some of these cases that the bones or ligaments of the spinal column are inflamed, and that irritation is communicated from these structures to the nerves passing through the intervertebral foramina. Hasse says "far oftener than is usually supposed, spinal tenderness is caused by disease of the vertebral column." In two severe cases lately under my care, which appeared at first to be purely instances of hysterical spine, the further course of events made the existence of vertebral disease probable. Dr. Little states that subjects of severe spinal curvature of any description are in later life martyrs to indigestion, hepatic derangement, and hysteria (universal hyperæsthesia). He ascribes these troubles to pressure on the sensitive nerves as they emerge from the spinal canal. This is rendered very probable by the good effects of apparatus which relieve the spine from part of the superincumbent weight. In other cases, again, which are benefited by depletion, the existing pathological condition may be a rheumatoid neuritis of the nerve-trunks proceeding from the intervertebral ganglia. This might be shifting, like the migratory inflammations of articular rheumatism, and so would account for the change of seat in the spinal tenderness when it suddenly removes from one part to another. Yet, though I feel bound to admit in evidence the experience of good authorities on this subject as to the effects of local treatment, I must add that my own leads me to think that such instances are rare, and that practically we gain little or nothing by the hypothesis of spinal (cord) irritation. In all the subjects of these disorders the whole nervous system is more or less deranged, and there seems no sufficient ground for regarding the cord as specially at fault. At the same time we need in doubtful instances to be very careful that we do not overlook the existence of insidious disease of the vertebræ—rheumatic caries, as Mr. Solly designates it—where suppuration does not occur, and deformity is slow to appear. The two histories he records (v. 'Surg. Experiences,' pp. 38—46) will well pay perusal. A case, probably of the same kind, came under my observation, which, as I obtained an autopsy, may be worth citing here.

CASE 1.—A man, æt. 65, had been in the habit of walking long distances, and fatiguing himself extremely. His illness came on gradually about 3 weeks before I saw him at the close of July. He died October 1st. His symptoms were extreme pain in the loins, on one or other side, not always on the same. The left loin appeared fuller than the right, which seemed rather wasted. The pain in the back was so great that he could not quit his bed, could not even turn without pain, nor bear to be raised up in bed by another person holding his hands. The lumbar spinous processes were sometimes very tender, at others bore pressure well. At one time the back was quite painless, the pain shifted to the left flank. He seemed to have no real paralysis; sometimes he had difficulty in standing, from the pain, at others he was able to walk about his room pretty well. The aortic valves were evidently insufficient. He had one attack of gout, and some trouble with piles. An eminent surgeon who saw him with me thought he had no organic disease of the bones or ligaments of the spine. On dissection the heart was found hypertrophied and the aortic valves inefficient. The intervertebral substance between the 3rd and 4th lumbar vertebræ was altered, and the adjacent bones were softened so that they could be cut with a knife, their cancellous tissue was black; no pus was seen; at the left side of these vertebræ, just at the top of the 4th, there was a notable prominence of bone, a kind of exostosis, but none of the viscera were adherent to it. The treatment pursued consisted solely of tonics and sedatives. Moxas or issues would probably have been of service.

The absence of general nervous disorder in this instance is very noteworthy, and the limitation of pain almost entirely to the seat of morbid change, as also the circumstance that tenderness of the spine was more often absent than present, and that the amount of pain varied much at different times. This case confirms Mr. Solly's anticipation that rheumatic caries is preceded by inflammation of the bone. He believes that if this osteal inflammation extends to the membranes of the cord we get evidence of spinal irritation.

The following, though not an instance of vertebral disease, is very instructive as showing how, in the midst of general good health, without apparent cause, a limited chronic osteitis may arise, and give rise to a good deal of nervous trouble.

Case 2.—S. C—, æt. 37, a steady sensible man, complained, April 26th, that he had been suffering 6 or 7 weeks with great tenderness of the external condyle of the humerus, much increased on pressure, and with pain extending down to the middle of forearm at outer part, and upwards to near the middle of the arm. The pain catches the flexor muscles of the upper arm and the radial extensors of the forearm when he is at work at his trade, or closing his hand in the act of grasping. Even when the arm is quiet he has a smarting inward pain. There is no apparent thickening of the periosteum, or swelling of the bone in the painful part, but the temperature seems to be somewhat increased. A blister to the part made the pain worse, so that he was obliged to leave off work. With leeches to the condyle, potassii iodid., muriate of ammonia, and ultimately a month in the country, he got quite well.

Had this man been a nervous subject it is probable the nerve troubles would have occupied a much wider range. And it is very intelligible that if one of the vertebræ had been similarly affected the disturbance might have been still greater.

In connection with this subject I may allude to *osteal neuralgia* as a very possible cause of spinal tenderness. The following is an instance:

Case 3.—W. S—, male, æt. 52, admitted December 7th. Ill 14 days. Is a strong-looking man, but has led a dissipated life; denies having had syphilis, but admits gonorrhœa. Never had gout, nor had his parents. He complained of a lichenoid eruption all over him, itching much when he was warm, and of great tenderness of the external condyle of the right humerus; this part feels just as if it was bruised, but there is no sign of any injury, and no thickening to be felt. The disorder came on gradually. The pain caused considerable impairment of the power of the elevator muscles of the right arm; he could not raise any weight, nor take down his coat from a peg, nor put it on. Health perfect. A blister over the condyle, pot. iod. gr. x *ter die*, quinine and strychnia with oleum morrh., were of great benefit, but three subcutaneous injections of Liq. Opii Sedat. and the inunction of veratria ointment almost removed the neuralgia by April 7th. As the neuralgia declined the arm regained strength. The itching was out of all proportion to the amount of eruption visible by day; it was greatly amended by citric acid gr. xv + Spt. Æth. Chlor. ♏x + Aq. ℥j *ter die.*

This case bears a striking resemblance to the preceding, but has less of the inflammatory and more of the neuralgic character. The amount of nervous disorder was proportionately increased. Supposing the vertebræ to be similarly affected, might not the symptoms have been very perplexing? This seems to be the view taken by Huss, who thinks that in spinal irritation there exists really a neuralgia of the vertebræ themselves. The case alluded to at p. 437 in the chapter on Headache is probably an example of this affection. Its persistence has been very remarkable.

The two following cases are good examples of so-called spinal irritation in pretty severe forms. They evidently differ a good deal, although they have also many points of resemblance, and it may not be unprofitable to compare them.

Case 4.—R. C. W—, æt. 38, male, admitted February 23rd, 1866. Until last 2 or 3 years he says he was as healthy a man as any breathing, never had a day's illness since he was 7 years old. Stout and well made, not anæmic. Not intemperate. He has worked very hard, carrying heavy loads on his back, and feels sure that these have injured him, especially the last, which he carried 6 months ago, and which 'ricked' his back, caused a snapping sensation in the right side of it. Has been suffering the last 4 months with short breath, cough, and spitting; he coughs for hours, but does not spit a great deal; what he does bring up is mere mucus. Lung and heart sounds quite normal. The cough is so severe that it causes him much pain in the back, and allows him to get but little sleep. His legs have been getting weak the last 2 months, he cannot walk as he used. Has lost flesh lately. Has general ichthyosis. Is very nervous, his hands are inclined to start and tremble. He was ordered Atropia gr. $\frac{1}{120}$ + Aq. Anisi ʒss *ter vel quater die*, and in 3 days his cough was nothing like what it had been; he had very quiet nights. The atropia was continued with Nitric acid and pernitrate of iron; cod-liver oil was given and port wine 4 oz. a day. March 9th.—The spasmodic cough remains quiet or nearly so, but pain in the back has become the prominent symptom. His spine is extremely sensitive from about the 1st or 2nd dorsal spinous process down to the sacrum; he flinches from any amount of pressure; on the right side of the column he has similar tenderness for some distance outward, and his pains extend quite to the fore part of the trunk. Superiorly the tender region extends up as high as the lower angle of the scapula and down as far as the buttocks; light pressure in this region is painful, and firm is much more so. Pinching up a fold of skin in the *right* lumbar region gives pain, but does not at all on the *left* corresponding part, where he also bears pressure well. When I send a current of air on the left back it causes no pain, but he flinches when I do the same to the right. He cannot bend his body to either side without uneasiness, but suffers much more when he bends to the right than when he does to the left. Is often kept awake by the pain at night for 2 or 3 hours. Warmth to the surface and rest relieve him, he is better therefore while lying in bed. On testing the sensibility of the skin with compasses, it appears greater in the right than in the left back; two points are distinguished at 1·5 inch on left, ·9 inch right; at a lower level ·75 left, ·2 right. However, as I was concluding the observation, I twice applied a single point to the skin of the right back, and he continued to declare that he felt two points in both trials, though there was only one. He does not appear at all hypochondriacal, but says he is nervous. His hands shake and his teeth chatter at times, in fact he shakes all over. Since he has been ill he went once to his former place to try to work, but was unable to carry the loads. I applied the continuous current and afterwards the interrupted; both were beneficial, but the latter more so. The report on April 2nd is that his hands are very tremulous the first thing in the morning; he has great difficulty in dressing himself, his hands feel cold even before he gets up, and he has to take both to hold his cup at breakfast. They get steady, however, by noon, and indeed seem so now at 10 a.m. His legs and back are nicely, he does not shrink at all from pressure on the spine or on the back, nor from pinching the skin. April 6th.—Back quite painless, hands less shaky, he can dress himself better, but is mentally hyperæsthetic if not worse, refuses to stay in the hospital because the patients jest at him. His mother states that he spoke incoherently to her yesterday. The ward sister describes him as very dissatisfied. The last time I saw him, April 10th, there was scarce anything else amiss than that he was fidgety and nervous. He could walk well and his back was comfortable. His treatment had been Iron and Quinine with Morphia internally, and subcutaneously afterwards assafœtida in large doses, and port wine 6 oz. His urine presented nothing abnormal. It seems to me no easy matter to say what was the real state of things here. Was it a mere case of manifold neurotic perturbation owing to some obscure change in the condition of the whole nervous system, or was the man's own version of the causation true, and had he really injured his spine (bones or ligaments, or contained cord) while carrying his loads, and were the various nerve disorders so many expressions of this central lesion. The latter view seems to me the more reasonable.

Case 5.—The second case is that of a man, æt. 43, engaged in an indoors employment. I have omitted to ascertain how long he had been ill, but certainly for some considerable time before he consulted me. His mother had been paralytic the last 5 years of her life, and his father and grandmother died suddenly of spasm of the heart. He used to suffer from asthma, but has had none since his general hyperæsthesia commenced. He had lost much flesh lately, was small and spare. His urine was normal. Bowels regular, except when he took steel. Bladder irritable. Appetite bad. No notable dyspepsia. Pulse quick, weak, jerky, regular. Pupils of medium size. No paralysis, but occasionally in walking there will be dragging of the left leg for a minute or two. His spine was excessively tender in most of its extent, he started convulsively on the least pressure upon the spinous processes, and also on pressure on the skin covering the long muscles of the back some distance on each side from the median line. His whole cutaneous surface was also very sensitive; some time ago he could not bear the least touch anywhere, could not bear to have his chest auscultated; and the other day the touch of a crinoline hoop against his leg in the railway carriage caused him "terrible pain." The sole of the left foot was often exquisitely sensitive, while the heel and the toes were quite numb. His chief pain was in the left side, about the heart, resembling spasm, it exhausted him very much; the contact of the clothes on his left side was very distressing, and he had also in the left hypochondrium a sense of a tumour and wetness. Any exhaustion will surely bring on pain in various parts and cramp. He has frequently while sitting involuntary startings and twitchings of both legs, and is woke up at night with twitchings of the arms. In walking, his steps were often impeded by jerking of the legs. Stiffness of the lower part of the spinal column and pain across the loins sometimes made it very difficult to rise up for several minutes after sitting, and for weeks together he has found it impossible to walk even a short distance without uneasiness or pain. In cold weather there was great stiffness of the left knee-joint, and more than usual numbness of left leg from hip to heel, so that it was difficult to use it. No great degree of cold will so stiffen the jaws as to affect speech. Employment of mind or body exhausts him, and obliges him to go and take stimulus, which restores him for a time. When exhausted he loses his memory and power of attention, and becomes incapable of going on with his business. The chief tenderness in the spine was in the dorsal region about its middle and to the left side. I tested the sensibility of the skin of the back with compasses, but it seemed to vary so much that nothing could be positively determined; at one time he felt the two points as one at ·6 inch, at another time at 1·5 inch. The prospect of doing this poor fellow good was exceedingly small, a sea-voyage, an open air life in a fine climate, and freedom from pecuniary pressure would doubtless have accomplished more than all drugs. But nitrate of silver, opium and camphor in small doses with Nitric acid, and cod-liver oil were of some use, and so was the free affusion of cold water on the back. Bromide of Potassium would probably have been useful, but I had less experience of it at that time than now.

The continuous resort to stimulants in cases of this kind is very objectionable; this man confessed they were his main stay. The amount taken is pretty sure to go on increasing, and the end to be delirium tremens. Such a case as this is evidently not one of lesion of the spinal column, nor can I see any ground for regarding the cord as any more affected than any other part of the nervous system. The condition is one of general hyperæsthesia, dependent probably on defective nutrition of the nerve tissue, and requiring for its cure to be dealt with by a complete change in the mode of life. The Griffins dwell very justly on the great benefit which sometimes results from change of scene in cases of this kind. Sufferers of this class deserve sincere commiseration, though we cannot help smiling at some of their miseries. Their malady is a fearfully real one, no less than insanity, Epilepsy, chorea, or asthma, to which it is allied. Mothers who, by foolish fondness, train their children to ways of which such is the ending, are in sober truth guilty of grievous cruelty. Better let a child run all sorts of risks than become a miserable hyperæsthetic.

The point should always be considered in cases of this kind how far the symptoms are the result of any toxic matter in the system. It is certain that latent gout may coincide with severe hypochondriasis, the latter subsiding when the articular affection becomes developed. Yet my experience of neurotic sufferers leads me to think that it is comparatively seldom that any toxic condition can be demonstrated. This may be, however, from our not possessing tests which are capable of detecting such poisons.

LEEDS SCHOOL OF MEDICINE

CHAPTER XXVI.

HYSTERIA.

This subject appropriately follows that of spinal irritation. The Griffins in their work repeatedly allude to the resemblances between the two states, and in perusing sundry of their cases it is difficult not to raise the question whether they were, indeed, anything else than hysteria. But then we feel the necessity of having some definition what is Hysteria, and we are very conscious how unable we are to give a satisfactory one. Opinions in the profession are a good deal divided, some inclining to cut the Gordian knot by declaring all such patients "malades imaginaires," whose only disorder is defect of will, while others (a much smaller number) are inclined to take almost the opposite view. The best authorities are, I think, those who recognise two essential factors of this malady, one a peculiar state of nervous system characterised by mobility and excitability, and the other an ill-regulated, deceitful, perverse mind. But I think, also, that we should do great wrong if we assumed that these two factors were equally developed in all cases, and if we did not admit that not unfrequently the latter scarcely exists or if it does, it is only in that slight and modified degree which may be fairly imputed to human infirmity and the stress of suffering. Few of us are so well organized and disciplined as to pass through a long monotonous course of wearisome trial and pain without having our moral feelings more or less deteriorated for the time. Certainly in the average male this deterioration does not often take the form of actual dishonesty and lying, but rather of outspoken anger and petulance. Yet even in men there is not uncommonly a tendency to exaggerate and make the most of their ailments, as is strikingly evident in hypochondriasis. In the female, however, whose instincts go rather in the direction of artifice and stratagem, this tendency expresses itself much more markedly, and if not resisted by steady principle, carries the mind away into a course of dissimulation ruinous to the character. But that this tendency very often is successfully resisted there can be no doubt, and the weaker sex perhaps, oftener than the stronger, exemplify the truth of the line—"How sublime a thing it is to suffer and be strong."

It seems to me that we shall be best fitted to deal with the manifold phenomena of hysteria if we, holding to the idea of its twofold origin in mind and body, in one *or* in the other, seek to determine in each individual case which mode of causation predominates. If the mind is chiefly at fault, we cannot look for good from physical agents, which may be of the utmost value if the disorder is of bodily origin. This first distinction is most important. But before we pass on we must make a remark respecting hysteria, or hysteria-like disorder of mental origin, viz. that it is not always, by any means, the result of a deceitful, selfish temper, or of any other perversion of the legitimate workings of the mind. It may depend on some severe stroke of affliction which has blighted the prospects of a life. Such has been known to cause dementia and epilepsy, and therefore may well conditionate hysteria. It is related of an eminent physician that he spent an hour alone by the side of his granddaughter's coffin, weeping passionately. The same night he was attacked with convulsions of an epileptic character, followed by paralysis. A similar attack recurred the two following years. Such sufferers it may be out of our power to relieve, but we must not class them, of course, with those who are victims to their own evil ways. We must pity, not blame. And I think we must say the same of many poor girls employed as milliners and sempstresses, toiling on day after day, month after month, year after year, with almost everything to dispirit and depress them. That they often become physically ill cannot be wondered at, but we have just as little reason to be surprised if their minds get unhinged and wander into all sorts of morbid fancies.

And, now, taking up the position that Hysteria may be mainly of bodily origin, let us see in what ways this result may be produced. First we may notice the possibility of its dependence on some *toxic matter in the blood.* Dr. Laycock believes that certain diatheses, especially the gouty, may give rise to the hysteric paroxysm, or to anomalous hysteric disease. This view is supported by Dr. Gairdner's statement, that "women are often, and particularly about the period when menstruation ceases, the victims of this form of gout. It is in them accompanied by much hysteria." A case some while ago, under my care, had very marked hysterical symptoms, with an absence of anæmia and dropsy, so that I did not at first discover that her kidneys were gravely diseased. It is probable that uræmia was the cause of the more prominent phenomena. However, I think it must be admitted in this instance, as in the case of most of the neuroses, that evidence is very wanting to show that blood-poisoning is a general or very frequent cause.

All *causes of exhaustion* are liable and likely to produce hysteria in those who, by peculiarity of constitution, are predisposed to the disorder. One of the sequelæ of heat-stroke enumerated by Sir R. Martin is a distressing hysterical state of the nervous system, with an absence of self-control in laughing and crying, the paroxysm being followed by great prostration of nervous power. The subjects of heat-stroke are it is well known much more often males than females, but there is no doubt that any similar enfeebling influence acting on the female system would be followed by similar effects. A gentleman after a hard day's work walked a long distance and became exhausted, so much so that on reaching his destination he fainted, but regained consciousness almost immediately. While lying on the floor, unable to rise on account of the erect posture bringing back the syncope, he had the utmost difficulty to restrain himself from bursting into a paroxysm of laughing and crying, and after recovery he passed a very large quantity of aqueous urine. The hysterical manifestations in this case were just so far apparent as to cause a bystander to remark that he was hysterical, but I am assured that they were purely the result of bodily exhaustion. Sir B. Brodie ('Local Nervous Affections,' p. 75) says, "These symptoms (of hysteria) are especially called into existence whenever from any cause the bodily powers are reduced below the ordinary standard."

Remote irritation is a well-recognised cause, and according to the older view, when starting from the female genital organs, was the essential cause of the disease. Romberg agrees with this view so far as to regard the uterus as the chief focus of reflex irritation, and states "that he has seen numerous instances demonstrating the futility of all remedies while this focus of hysteria, if existing, is overlooked." Dr. Conolly admits that the disordered state of the nervous system may very frequently be induced by uterine irritation, but affirms that it no less evidently arises in other cases from causes productive of irritation in other parts of the body, and also from causes acting directly on the mind. Sch. v. de Kolk states (p. 276, Syd. Soc. Ed.) that "two instances occurred to him of obstinate melancholy, with prolapsus, where the melancholy gave way at the very moment when the uterus was replaced." It seems only reasonable to conclude that hysteria might be produced in the same way. Dr. Ashwell recognises derangement of the stomach and bowels as not unfrequently the source of the irritation on which depends the hysteric attack, and observes that in cases where the state of the alvine secretions has not been duly regarded at first, their restoration to a healthy condition has for a time at least stopped the hysteric attacks. In the following instance irritation of cutaneous nerves was the cause. A single lady wounded her hand one day at the root of the midfinger with a knife while cutting bread. "She sat still for a time, afterwards she laughed, cried, and kicked." These hysterical symptoms could hardly have been the effect of alarm, or they would have come on sooner, and it is perfectly certain they were not manufactured for the purpose of exciting interest. It is very much to the purpose that some years later, when married, she cut her thumb with broken glass; soon after she felt some degree of stiffness of the jaws, and a peculiar nervousness. With bark and ammonia she gradually recovered. It seems reasonable to regard the manifestations of hysteria on the first occasion to have been produced in the same way as those of tetanus in the second.

Whether Hysteria may be occasioned by *structural lesion of the brain* is not fully ascertained. The general opinion is adverse, but I am rather inclined to think that such may be the case, at least in persons who by age and sex and constitution are qualified to be so affected. There is a case recorded by Dr. Todd which is well worth citing from its bearing upon this question. M. A. H—, æt. 19, was admitted January 28th. She was of healthy parentage, had always lived in the country, her general health had never been very good, and 3 years before her admission she had had typhus fever. The catamenia were regular, lately had been excessive. She had frequent attacks of giddiness, and was subject to great variation in her flow of spirits. Two months before her admission paralysis of motion and sensation of the right leg commenced, extended upwards, and afterwards involved the arm and face. She had *latterly* become subject to hysterical fits of a very severe kind; these continued together with the hemiplegia, and in one of these fits she died 8 months from the commencement of her illness. At the autopsy considerable softening of the left hemisphere was discovered, the result of tubercular deposit. The appetite at first was very good, almost ravenous; at a later period she had attacks of violent sickness lasting 2 or 3 days. No reflex actions could be produced. Dr. Todd viewed the case as an example of the hysterical diathesis highly developed, and complicating the effects of cerebral lesion. He describes the hysterical phenomena as being of an exquisite character to a degree which cannot be fully appreciated by those who did not see the patient. Coincidently with the attacks of sickness the hysterical paroxysms increased in frequency and severity, being so severe as to border on the Epileptic, but not attended with unconsciousness. From the late supervention of the hysteria, the severity of the paroxysms, their aggravation, together with the hemiplegia, and the occurrence of death in one of them, it seems to me just to conclude that the hysterical attacks, as well as the paralysis, were essentially owing to the cerebral lesion, and I have no doubt that both were equally and completely involuntary. It is possible that the hysterical diathesis which this girl as well as her sisters possessed gave its peculiar tone and character to the convulsions, but yet I cannot doubt that they were as much of physical origin as those which ensue occasionally in cases of cerebral hæmorrhage, and are like those in this case on the same side as the cerebral lesion.

But when the above position (that hysteria may be of bodily origin) is conceded, it remains unquestionably true that in the great majority of cases the convulsive paroxysm is the direct result of indulged emotion, though occasionally the impulse to the passion may be so strong and natural, or the nerve-power may be so enfeebled in the controlling centre that the patient may be held quite innocent of voluntarily yielding up herself to it. I quite agree with Mr. Carter where he says that "paroxysms of the primary and secondary kinds may often be induced by the operation of an exciting cause, so powerful that no effort of the will would be sufficient to prevent their taking place, even if it succeeded in delaying them for a time. But such cases are rare when compared with those in which the occurrence of the fit, though not volitional, is yet a matter of surrender, and might be prevented under the presence of an adequate motive." He gives, at p. 47, an amusing illustration of this, where an epidemic of hysteria in a workhouse was arrested by obliging those not affected to attend constantly without having food or rest to those who were attacked, an occupation which they found very disagreeable, and which incensed them proportionally against those who were the cause of it. In further confirmation of what I have advanced I subjoin from my own records two cases of what I may term voluntary and some of involuntary hysteria.

CASE 1.—M. J. B—, æt. 19, admitted October 10th, 1867. A well-made girl, not anæmic, tolerably muscular, of dark, healthy complexion, sent up from the country. She states that her illness began with fright, another young girl was frightened to death. The cause of her fright was hearing something in an underground cellar! The fright brought on a fit next day, which lasted 6 hours, during the whole of which time she was insensible. Her hands in the fit were drawn inwards, and her whole body stretched out very stiff. She has never been to service since, and has been in bed the last 18 months. During the first year she used to have similar fits every day, sometimes 5 or 6. During the last 6 months she had only had 3 or 4. The whole duration of the illness has been 2 years, during most of which time the catamenia have been deficient and very irregular. She says she has had abscesses in her inside, and has vomited pus. Her spirits are very low; she frequently cries. Has globus hystericus. Sleeps badly, sometimes has none for 7 or 14 days. Complains of pain in the pericardial region and over lungs. Has pain nearly always in the lumbar vertebræ, and tenderness, but is able to lie on her back. Tongue clean and moist. Pulse 95, not particularly weak. Bowels costive. Is able to walk about with a little help. The day after her admission she was dressed, lying on her bed at the time of my visit; but I learnt that she entirely refused food, had taken none. Some time previously she had to be fed with the stomach-pump for the same reason. She was ordered a tepid shower bath and valerian and ammonia, and, in case of continuing to refuse to take food, the stomach-pump. This was used once or twice, but was soon unnecessary, as she took food voluntarily, though she was sick after it, and asked to have eggs and bacon and port wine, which was acceded to! On the 17th she was looking morose and sullen, expressed her determination to go out, as her friends were coming to see her, and she expected they would take her home. She continued to vomit after food. Her friends declined to remove her, and so she made up her mind to stay and make the best of it. She improved immediately, took her food well, and was tolerably cheerful and well-behaved. To encourage her I gave her a visit to the Zoological Gardens, which answered very well, and up to the last date when I have any notes, viz., November 27th, she was cheery and well, having but little sickness. She had been O.P. then for about a fortnight. It is, of course, almost certain that she relapsed again as soon as she was left to her own devices. Nevertheless, the history affords a good illustration of the beneficial effect of suitable moral management, even in very unfavorable cases. To carry out such treatment, however, effectually, and for a sufficient length of time, requires special arrangements, and, indeed, a special person to have charge of the patient.

No one has apprehended or described the proper mode of dealing with aggravated cases of voluntary hysteria in a more masterly manner than Mr. Carter, whose chapter on treatment I commend to all practitioners as deserving most careful study. Isolation of the patient from her relatives, residence in the family of an able medical adviser, and firm, but kindly dealing, comprising not only moral suasion but an unsparing analysis of dishonest ways, constitute the essentials of his procedure, which Mr. Mackenzie is known to have practised very successfully. If it were possible to rely on the statements of M. J. B., the attacks would be more properly regarded as epileptic than hysterical, seeing that she was insensible and quite rigid, both which are characters of the former malady. I should, however, be more guided in my estimate of the nature of a case by the whole aspect than by one or two features. To this subject of hysterical epilepsy I may again return.

The following case is one of non-paroxysmal disorder.

Case 2.—M. K—, æt. 27, female, admitted September 12th. Has aphonia; can only speak in a whisper. Lies in bed with both legs crooked up, with the heels against the buttocks; complains very much of pain when any attempt is made to straighten them. The limbs are rather, but not very much, wasted. Says that 10 years ago she fell down and hurt one leg, which then became drawn up; two years ago she took cold, and the other leg followed, and both have remained as at present ever since. Cannot pass her urine freely, she says; but on being examined is found to have passed a quantity in bed. Chloroform was administered, and as soon as she became insensible the legs were brought straight down with perfect facility, and, being thus disposed, they were tied to the bed posts. 16th.—Has scalded her face and mouth pretty smartly with boiling water purposely—she was caught in the act. Sent out soon after. This girl was determined to be ill in one way or other, and as she was not allowed to persevere in her first plan, she adopted another. Clearly it would have been futile to have given her physic, unless, perhaps, it had been the "*infusum benedictum*" which was once found effectual in curing a number of malingering soldiers, and was compounded of a weak infusion of tobacco and Epsom salts!

The following cases are of a very different stamp:

Case 3.—F. U—, female, æt. 30, single, admitted April 20th. Ill three years. Has no strength, legs are weak; feels suffocated at times, more so at night. Her throat is not sore, but her voice is weak. When the suffocative attacks come on her legs give way and she drops. At times she becomes quite unconscious for a few minutes. Gets worse at the end of the week; is better for the Sunday's rest. Works from 7 a.m. to 12 at night in a laundry. Pulse weak. Tongue clean. Ordered strychnia + tr. ferri muriat. + chloric ether *ter die.* May 4th.—Has been better, but had a bad attack of choking and suffocation on 30th, when catamenia were present, "is always worse at those times." She continued the same mixture, or a very similar one, up to July 6th, and improved very considerably, so that the attacks occurred much more rarely than they had done; she had been without any when last seen for fourteen days.

REMARKS.—These attacks must have had much of the outward appearance of hysteria, since she herself described them to me as such. Yet surely there was cause enough in the unhealthy and excessive toil she had to endure for almost any amount of nerve disorder. Which of us, I should like to know, would not have collapsed under a long continuation of it? In spite, however, of her unfavorable circumstances, she rallied bravely, and gladly acknowledged the improvement in her health, the last thing which an hysteric is inclined to do.

The next case is similar.

CASE 4.—E. S—, æt. 17, female, single, admitted September 22nd. Ill twelve months; has improved, but has relapsed last three. Is hysterical, the attacks come on at the monthly periods; she becomes giddy, very nervous and weak at the chest, and goes off into convulsions at those times. The heat of the laundry work seems to bring on the attacks. She takes food fairly; does not seem hyperæsthetic. Tongue coated. Bowels costive. With iron and quinine she improved steadily and satisfactorily during a period of more than two months.

CASE 5.—Mrs. A—, æt. 35, seen June 28th, a very sensible, calm person, of well-regulated mind. Has not been feeling well some days; her power of attention and her memory is impaired; cannot read as usual. Over-fatigued herself yesterday. Is now suffering severely with headache, referred to the vertex, compared to a heavy pressure, and darting through the head at times. Head not hot. Has much difficulty to restrain herself from "hysterical crying;" finds a lump rising in her throat. Headache not increased by lying low. Had scarce any sleep last night. No appetite at all. With tonics and country air she soon got quite well.

CASE 6.—E. A—, female, æt. 38, single, admitted February 16th. Tall, slight, hair quite grey. Has been ill one month; had first swelling of the right knee, followed by bad cough and pain in left side, which she has had a week. On admission she presented all the signs of a highly marked neurotic diathesis, tremor of the eyelids, aphonia, and panting, hurried respiration. Skin cool. Pulse weak. Auscultation of the left side detected nothing morbid. I was averse to taking her in, as I was afraid she would prove an unsatisfactory patient, but was overruled. Liq. Opii Sedat. ♏x was injected subcutaneously into the left side, and she was ordered Pot. Iod. gr. ij + Ammon. Carb. gr. iv + Tr. Valerian ʒj + Inf. Valerian ℥j, *ter die;* Linim. Bellad. lateri; port wine 4 oz. 18th.—Much the same; has a most woe-begone, nervous aspect, not suggestive to me of real suffering; face flushed; voice whispering, but easily audible. March 6th.—Has regained her voice; is sitting up; has been faradized once or twice. Called out sufficiently loud this morning to be heard across the ward on being told that if she did faradization should not be employed. 9th.—Suffered very much yesterday from neuralgia, confined to the right half of the head and face; speaks audibly; asks for iron and quinine, which always does her good. Ferri et Quinæ Citrat. gr. x + Spt. Æth. Chlor. ♏xv + Aq. ℥j, *ter die.* 12th. —Is better, gets stronger; the neuralgia is nothing like so bad as it was. She always has it more or less. She gave me the following history of her previous illness. Before she was 17 she had typhoid followed by rheumatic fever; soon after this her hair began to turn grey. In 1851, while at Blackheath, she had so-called congestion of the brain; used to be light-headed every other day for a week, and then had low fever for nearly 3 months after. Of late years has suffered much from low fever, had it much last night; her tongue was quite parched. In these attacks of low fever her skin gets very hot and rough, and afterwards she perspires a great deal; they make her very weak. She has them on and off all the year round. Is always better when taking iron + quinine, she always resorts to it as long as she can afford to purchase it. Cod-liver oil has also done her a great deal of good. She went out about a week after very fairly well; her voice was rather weak, but not more so than that of many persons; her neuralgia was in its usual amount. I have omitted to mention that during the first 7 or 10 days of her stay in the hospital she lay continually or almost continually in bed half asleep. Subsequently she had no unusual drowsiness. I believe this desire for rest really proceeded from an exhausted brain, and that she followed nature's dictates in yielding to it. Yet it might have been regarded as mere laziness. The aphonia was plainly the so-called hysterical. But was it owing to want of will or want of power? Some may think that the fact of her finding her voice under the stimulus of desire to escape faradization is sufficient proof that her will was defective. To me it does not appear that, admitting this motive to have had some effect, she is thereby in any degree convicted of malingering any more than we should think ourselves to be if, being very tired, we declined to move for any ordinary cause, but nevertheless started up and bestirred ourselves actively for some important object. There is no question (unless we disbelieve her tale altogether) that she had suffered for a very considerable time from a most wearying and enfeebling malady, chronic, obscure, remittent fever, with its attendant neuralgia, and that she improved very materially under an appropriate treatment. She had a bodily disorder which was amended by physical agents, and I think it would have been sheer cruelty to have pronounced her a malingerer and neglected to give her the restorative remedies which she herself asked for from former experience of their good effects. I have recorded the case just as I took the notes at the time, and I am free to confess that my opinion of her was much modified as I came to know more of her story. In another case apparently very similar faradization had no good effect whatever. The patient struggled a great deal, but I could not get her to utter a sound, and when it was repeated subsequently she refused to attend any more. Here I do not doubt the will and not the power was most at fault.

Case 7.—M. S—, æt. 28, single, female, admitted June 26th, 1867. Has had rheumatic fever 4 times; has been ill as at present 6 years; the disorder has diminished at various times before, but has now been severe since last January. She suffers in the following manner:—While in bed at night she wakes up with loss of sight, or hearing, or speech; has lost the two former faculties simultaneously, but not the three together. The first time she was attacked she became blind, and remained so 28 days. The blindness as well as the other anæsthesiæ usually continue 24 hours. She does not feel bodily ill at these times. Sometimes also she loses at night the use of her left arm or leg, which become rigid. Except on one occasion the affection of the limbs has always occurred apart from that of the sight, hearing, and speech. A sudden fright will bring on the disorder of the limbs, but not that of the senses. Always has pain in the head, chiefly on the left side. The left knee at present is fully flexed, and if I attempt to straighten it the flexor muscles immediately contract more strongly (as if voluntarily), and she complains of much pain. Pulse 84, steady and regular. Appetite good. Has brought up in mornings a small quantity of clear blood. Potassii Bromidi gr. xx + M. C. ℥j, *ter die*. 28th.—The contraction of the leg disappeared yesterday; the same evening the lower jaw dropped very much, she could not close her mouth; her cheeks and eyelids were also drawn down, large drops of perspiration stood on her forehead; she had a kind of tremor all over, but was quite conscious. This state of things lasted half an hour. 29th.—Shower bath on alternate mornings. Urine, sp. gr. 1019, is free from albumen. July 1st.—Her left arm got stiff about 2 a.m. yesterday, but recovered about 8 p.m.; it was agitated with clonic movements while it was recovering. Likes her shower-bath. 3rd.—Her jaw dropped again last night, and she lost her sight from 9 p.m. to 8 a.m. this morning; her sight returned while she was in the shower-bath. She affirms that in these seizures she cannot distinguish light from darkness. 10th.—Is doing well, no returns of disorder; *asks* to have her shower-bath every morning; ordered so. 13th.—Doing well, has only some backache. Potass. Bromidi gr. x + Tr. Cinchonæ ʒj + Aq. ℥j, *ter die*. I learned to-day for the first time that she had a sudden fright 6 years ago from the sudden death of a cousin to whom she was much attached, probably her *fiancè*. This occurred in January, and in March her attacks came on. 17th.—Continues to do well; is better than she has been for a long time. She continued the Bromide at the dose of gr. xv, *ter die*, and when last seen, Sept. 14th, had been 6 weeks without an attack. When I showed the notes of this case to a well-instructed physician, the word 'hysterical' was on his lips immediately, and the same was the impression on the mind of my intelligent clerk, Mr. Palk. For myself I doubted. On the one hand the apparent voluntary action of the flexor muscles of the contracted limb looked suspicious; on the other the symptoms were less persistent than one would expect in a case of malingering, and were also peculiar. I was not acquainted with the probable cause of the malady until she had been more than a fortnight under my care, or I should have felt less doubt as to the real nature of the case.

It needs, I suppose, no argument to prove that these latter cases were essentially different from the first two, and different in the most important respect, viz. that their 'morale' was healthy and sound, and that they were really desirous to get well. With the first two mental perversion constituted almost the sole disorder, and moral discipline alone could avail. With the others it was very different. Yet most practitioners would have applied the epithet 'hysterical' to both, and thereby, if they had not distinguished further, would have done an injustice.

But if it be asked how the one class of cases are to be distinguished from the other I must admit that the discrimination is not always to be made offhand, nor without some acquaintance with the individual patient. We must look to her history, we must try to ascertain under what circumstances the disorder has come on. We must learn whether she has suffered severely in mind or body, whether she has been depressed by prolonged anxiety, grief, care, or any other trouble. We must take count of her bodily condition, and inquire whether she has been debilitated by menorrhagia, hæmorrhoids, lactation, acute illness, or malarious influence; whether there is reason to think that a toxic condition of blood such as gouty, or some remote irritation, intestinal, uterine, or ovarian, may be vexing and depressing the nervous centres. We must note whether she can take thought for others, or is utterly selfish and absorbed in her own small miseries. We must observe whether she has an ear for the call of duty, or only for that of pleasure. We must not be too harsh in our judgment, even when circumstances may look rather suspicious, especially when we are dealing with the overstrained and overworked, whether in high or low station. We must remember that sympathy under suffering is naturally and lawfully desired by us all, and that it may be hard for us to appreciate the amount of distress which another may be enduring. The Psalmist, writing prophetically of the purest and noblest that ever wore human form, makes Him say, "I looked for some to have pity (lament with me), but there was no man, and for comforters, but I found none." If He, the sinless One, felt this need, much more may we. So long as the desire does not warp the moral sense, and lead to downright selfishness or wilful deception, we should lean in our judgment to the side of charity. But when once this limit is passed, and we feel that the patient is no longer trustworthy, we ought to suspend medicine, for otherwise we become, as Mr. Carter tells us, most helpful accomplices in her impostures. The most difficult cases are those (and they are far from being infrequent) where there is unquestionably physical derangement as well as mental, and it is a hard matter to discover whether the latter is or is not (as it surely may be) dependent on the former. Here we must watchfully observe the effect of physical and moral agencies, and according as the one or the other avail we must frame our judgment of the individual case.

There are some peculiar forms of hysterical manifestation which it may be as well to notice specially. These are paralysis, mania, and epilepsy. Hysterical paralysis may be more or less extensive, may be confined to one organ, as the bladder or larynx or one limb, or may occupy both lower limbs (paraplegia) or those of one side (hemiplegia). Such paralysis, Dr. Todd states, is most liable to occur in the period immediately following that of puberty and that preceding the change of life, and is brought on by exhausting causes, such as excessive menstruation, leucorrhœa, over-work, or anxiety, or excitement, or by any debilitating influences. Benedikt states that hysterical paralyses are characterised by simultaneously existing anæsthesia of the skin, the muscles and the joints; by the essential diminution of muscular contractility as tested by intramuscular stimulation, while it appeared to be normal when the plexus or the large nerve-trunks were excited; by the sudden change of cutaneous anæsthesia into hyperæsthesia in consequence of electric stimulation of the plexus; and by the original deficiency of excentric sensibility, and its restoration *pari passu* with the sense of touch. The essence of hysteria consists, according to Benedikt, in increased irritability with diminished conducting power of the nerve. When irritability predominates, convulsions and such like phenomena ensue; when the failure of conducting power is the chief defect palsies and other symptoms of depression occur. He considers that both the central and peripheral nervous apparatus is morbidly affected. ('Schmidt Jahrb.,' Vol. 121, p. 42.) My own observation has, I think, shown me this that in paralyses apparently of hysterical character faradization conducted in the usual way, one sponge applied over the muscle, and the other over the nerve trunk supplying it, has produced much less effect than in paralysis depending on undoubted central disease. At first a much stronger current can be borne than when recovery has made some progress. On the other hand Dr. R. Reynolds states that the electric irritability persists in the palsied limb, though the electric sensibility is sometimes diminished, and Dr. Althaus' experience is similar, except in instances of long standing.

Hysterical hemiplegia differs from that depending on cerebral lesion in the face and tongue being mostly unaffected, in the paralysis being incomplete, and the weakened leg in walking being trailed along "as if lifeless sweeping the ground." Dr. R. Reynolds also remarks that the hysteric patient raises the great toe in moving the foot forwards as a healthy person does. Loss of power over the sphincters does not occur in hysterical paralysis. A feature which when present is decisive, is the paralysis either disappearing spontaneously and suddenly altogether, or ceasing and returning again in the same or in some other part. All that has been said above as to the occurrence of hysteria from purely physical disorder applies I believe to hysterical paralysis. I entertain no doubt that this term is often applied to cases of simple functional paresis entirely unconnected with hysteria, in so far at least as mental perversion or defect of will is concerned. Such was the following, for which I am indebted to the kindness of Dr. Stewart.

Case 8.—Mr. ——, æt. 40—45, of gouty family, and very nervous temperament, had long been subjected to attacks resembling laryngitis. Just before his illness on this occasion he had been in great anxiety on account of his wife's health, had been fatigued while nursing her, and with various cares. He had no renal disease. While going upstairs to his wife's bedroom in advance of the medical attendants, he suddenly staggered, and would have fallen backwards had he not been caught. He was now found to be quite hemiplegic on the right side, consciousness unimpaired, speech nearly lost, face very much distorted. He was put to bed, slept tolerably, and next morning, when seen at 8 a m., all symptoms of palsy had disappeared, but returned again after breakfast. The paralysis ceased and recurred again for several days in the same manner, but he was always free from it in the morning. Some time after it ceased to recur, any nervous excitement or extra fatigue would reproduce the disorder in a greater or less degree. Shortly afterwards he was seized with complete aphonia, and the same has repeatedly occurred subsequently, but has twice been removed by galvanism. In the winter of 1861—62 he had a return of the paralytic symptoms, accompanied by rheumatic pains in several joints, the left shoulder and muscles of neck being very stiff.

The opinion of three eminent men who saw him was that no organic disease existed. The paralysis in this instance was certainly not feigned, and is fairly attributable to exhaustion of nerve power, seeing that it was removed by repose and reproduced by fatigue. The aphonia was, doubtless, a paresis of the same kind, and so it was in the case of E. A—, related at p. 475.

The following case is very different.

Case 9.—C. P—, æt. 21, wife of carpenter, admitted February 7th, 1868, married 19 months, 1 child, who died when 14 days old. Always had good health till last Christmas. Has been obliged to use extra exertion or be helped to get up from a chair or to rise from her bed since that time. Has also had double vision during the same time, mostly in full daylight. Was first taken with loss of power in both hands and arms, which has continued off and on last 6 weeks. On February 5th she fell down from loss of muscular power in both legs, and as soon as she got up fell down again. This morning her head was in continual motion; it is quiet now. Grasping power of both hands tolerably good. Pupils equal, rather large. Catamenia regular. Pulse 76, soft, and of fair force. Bowels costive. Appetite middling. Nights restless. Relatives healthy. The urine was not albuminous, sp. gr. 1023, rather high coloured. She remained about 3 weeks in the hospital, continued to have the same symptoms, derived no benefit whatever from Valerian + ammonia, strychnia, and the shower-bath, and, as a 'grand finale,' had two attacks of violent hysteria. On being lectured for making "such a terrible fuss," as a very reliable ward nurse described it, she requested to be discharged, and so left.

Here there was no indication of physical malady, but certainly a good deal of moral.

Hysterical mania is occasionally met with. Griesinger states (Syd. Soc. ed., p. 180) that serious hysterical mental disorders are manifested principally in two different forms. In the first place as *acute* attacks of delirium and excitement, even to developed mania. These are developed sometimes from ordinary hysterical convulsive attacks, which, however, may be very slight; sometimes they appear to occur instead of these convulsive attacks, which are then entirely absent. Such maniacal attacks are sometimes observed in very young girls, who after the disorder has passed away retain but slight remembrance of what has taken place. In the second place, the malady may appear in a *chronic* form, in the guise of melancholia or mania. It commences sometimes as a slow, gradual increase of the habitual hysterical disposition; the symptoms gradually appear more persistent and more intense, the patient becomes more and more incapable of self-control. Sometimes it commences acutely under the influence of mental emotion or menstrual derangement, &c., after a few slight, perhaps incomplete, hysterical attacks. The symptoms almost always become aggravated at the menstrual period. Ecstatic states are occasionally presented in the higher grades; hysterical insanity passes more frequently into dementia than one might at first believe. Griesinger remarks on the frequency of well-marked hereditary predisposition to neuroses in these patients, and of local diseases of the genital organs. Chlorosis and menstrual derangement are also frequent, but disappearance of the latter often occurs without any improvement of the hysteria.

I subjoin two illustrative cases, the first of an acute kind.

CASE 10.—Miss ——, æt. 17, a hearty strong girl, employed in a respectable tavern. She is by no means anæmic. Catamenia regular. On December 11th she was quite well until some time after a plain ordinary dinner, when she suddenly fell into a state of the most violent hysterical delirium. She threw herself wildly about, two men could barely hold her; laughed and talked in a wild random way, yet recognised those about her, and particularly distinguished me as having attended her brother who had been recently ill. She went on in this way, screaming frequently so loud that I heard her two doors off in my own room, and thought it was some drunken man. The only possible cause I could hear of for the 'émeute' was a tiff she had had with her brother lately. Liq. Opii Sed. ♏30 made no impression on her, at least in a short time; but Chloroform at once produced a sedative effect, and she became much quieter. A mustard footbath was administered, and she was removed to bed, where she went to sleep, after some shivering, about 4 hours from the time of the seizure, and slept well till about 4 a.m., and less soundly after. When I visited her, about 11 a.m. of the 12th; she was quite conscious and quiet, and seemed in her usual state; had no recollection whatever of the excitement she had been in the evening before. Quinæ Disulph. gr. ij + Pil. Galbani Co. gr. vj in pil. ij *ter die* was ordered, and two days later Ammonia, Bark, and Valerian. No similarly severe attack occurred, but she had during the next 10 days several hysterical fits of short duration. She had besides illusions, at times fancying she saw bears or other animals. Occasional flying pains also were felt in the left side of the face, the chest, and elsewhere. The catamenia appeared in the usual way. She was much improved when I took my leave.

I cannot think that emotion had anything to do with the disorder in this instance, nor can I see any satisfactory way of accounting for it. It is, however, worth mention that her brother shortly before had experienced a peculiar seizure, having some of the features of epilepsy, so that it seems as if there was an hereditary tendency to neurotic maladies. The good effect of the chloroform was very apparent.

Dr. Barclay relates a more chronic case (v. 'Lancet,' 1861, Vol. I, p. 391).

Case 11.—The patient was single, æt. 27, and her increasing symptoms had been fostered for 10 years by the improper and indiscreet conduct of her companions. At first slight cough, then paralysis, fits, convulsions, and finally mania followed, in which religious delusions were prominent. These symptoms soon assumed a periodic character, and were readily induced by any slight exertion. Last summer severe vomiting occurred, and an increased liability to convulsive seizures. Her catamenia were regular, and her general health was good. When Dr. Barclay first saw the case there was slight paralysis of the legs and of the right arm, which he readily referred to an hysterical origin, though considerable doubt was expressed by her other medical attendant. If any doubt existed as to the nature of her attacks, it was removed when the symptoms of hysterical insanity commenced. These occurred in paroxysms in which delusions were present, and the seizures terminated by an attack of hysterical convulsions. The expression of the face and the language were so characteristic of mania that Dr. Barclay at first feared their dependence on it, and it was only after a careful examination of the case in all its bearings that all doubt was removed.

The manifold and varying phenomena in this instance seem to have culminated in mania, and that so similar to ordinary mania as not to be easily distinguished. So much tendency is there for one kind of disease to approximate to another.

Hysterical coma, at least in a high degree, is not a very frequent occurrence, but the practitioner needs to be aware of it, and able to recognise it, as the following history shows. Its occurrence may be looked for chiefly in the torpid variety of hysteria.

Case 12.—E. R—, æt. 20, daughter of highly scrofulous parents, at the age of 14 had scrofulous ophthalmia, which left bad opacities. This was followed by bronchocele, and this by loss of voice, which continued with some intermissions till 1857. About 1852 mesenteric enlargement came on and continued upwards of 2 years, interfering very much with the healthy development of the system, and attended with torpor of the whole frame and troublesome hysterical symptoms. After some 18 months' treatment the abdominal tumefaction began to subside, and some months later the hysteric fits became gradually of an epileptic character, and on one occasion, in the autumn of 1855, she had as many as 8 distinct seizures. After a very hearty supper she had a severe fit, in which the eyes became closed and articulation totally lost for 18 weeks. During the whole time of this partially insensible state she had occasional fits, and during the early part of the attack she passed her motions and urine involuntarily, and seemed to all appearance like a person labouring under the coma attendant upon apoplexy. In the course of 6 or 7 weeks consciousness gradually returned, she showed some restlessness when she wished to pass her motions, and made signs for food and drink. The catamenia appeared once, and the first time only during the early part of the semi-unconscious state. On one or two occasions it was tried to raise her from the bed, but the body became perfectly rigid, and convulsions were sometimes induced thereby. If, after the trunk was raised in bed, the support was withdrawn, it fell like a totally inanimate substance. She would generally put out her tongue when requested, and sometimes nod assent to questions. At the time of her sister's death (a month from the commencement of the insensibility) she showed some tokens of being aware of the event. The insertion of a seton in the neck caused no apparent pain. After the discharge had been established about a month one eye opened, and next day the other, and the day following she spoke and conversed with her mother, which she had not done for upwards of 5 months. She had no recollection of her sister's death, nor, indeed, of anything that had occurred in the interval. After having recovered thus far she gradually improved, but remained in bed another week. Aphonia, however, returned again, and had continued a year at the date of the report; there was dysphagia, the mind was weak, and the system generally in a very feeble condition. The various members of the family are below the average standard of intellect.

The case was related by Dr. Williams before the South Midland branch of the British Medical Association, where the general opinion seems to have been that the symptoms were dependent on the presence of scrofulous tubercles in the brain, probably about the crura cerebri and origin of the portio dura, which kept up irritation until absorption gradually took place (v. 'Brit. Med. Jour.,' 1857, November 7th). Dr. Williams entitles the case hysterical coma with paralysis, and I think the view he takes is essentially correct Had tubercles existed in the brain it is almost a matter of certainty that life would have been terminated at an early date, whereas she was still living 18 months after her recovery from her trance. The association of struma and defective condition of the nervous system has often been noted. How far the patient was in any degree accessory to the production of the quasi-coma must be left to each reader's judgment. To me it seems that the existence of struma, hystero-epileptic fits, and an hereditary weak brain, are sufficient to account for such a state without any intentional simulation. Had she pretended to dispense with food the case would have appeared to me much more suspicious.

It is easy to lay down distinctions between epileptic and hysterical seizures, but in actual practice cases are not very unfrequent in which one or more of the boundary lines are effaced, and it becomes difficult to state positively what is the exact position of the disease we have to do with. Trousseau remarks that hysterical fits in females may resemble most deceptively epileptic fits, and for my part I doubt whether in such cases the resemblance does not become so real as to amount almost to identity. The following is a fair instance of hysterical epilepsy.

Case 13.—Miss S—, æt. 25, had suffered 3 or 4 months before I saw her with a very severe fit of obstruction of the bowels, which nearly killed her, and from which she recovered very weak and depressed in spirits. The gentleman under whose care she had been informed me that she was very hysterical, and at one time used to have violent fits of hysteria, but that they had become milder lately and more like hysterical epilepsy. Amenorrhœa had existed for 4 months, except some slight appearance, and she had had vicarious hæmoptysis to half a pint. Her manner was quick, her complexion dull, skin thick, with traces of acne. She admitted having lived a very pleasure-seeking life, always at balls and parties, but had no strength now. Pulse extremely weak, 80. Heart's sounds normal. Tongue clean. Bowels kept regular. Nights very restless. No pain after food. Catamenia present when I saw her in August. The previous October she had some symptoms, consisting of nervous feelings, loss of memory, inability to meet persons. During March and April she had very severe, almost continual, attacks of convulsions during and after the obstruction of the bowels; it used to take 4 persons to hold her. At present she has attacks about once a day, becomes quite unconscious for 15 minutes, her hands are contracted for some time after, and she has a sense of cramp all down the left side, with feeling of pins and needles. Before an attack her face becomes very red; is not pale during the attack. She is quite stiff during the fit, her mouth at times open, has bit her tongue, grinds her teeth, and has broken them. Feels fatigued after the attacks, which sometimes occur by night, mostly by day; are brought on by anything that startles her. Has much palpitation at all times. Her face flushes much, especially after eating; her head feels intensely hot inside, and she has had headache at the forehead and vertex. Hands and feet are apt to be cold, head rather hot. Is much tried by hot weather. Once passed a large round worm at age of 4 or 5, and had one convulsive attack when a child. A sister has suffered from severe pain at stomach, indigestion, and faintings. I advised Potass. Bromidi gr. xx-xxx + Aq. ℥j *ter die,* and Extr. Belladon. gr. $\frac{1}{4}$ *ter die,* as well as Cod-liver oleine ʒij once or twice daily. With this she was much better for some time, but in the summer of 1868, while staying in London, she had a relapse, and came under the care of two eminent physicians, who prescribed tonics and hypodermic injection of atropine daily for the fits, "which were a mixture of epilepsy with hysteria." She still has slight attacks, but has been much better in every respect for some time, and is able to go out and enjoy herself. It is worth mentioning, as bearing on the efficacy of treatment, that change of air had not effected any material improvement.

CHAPTER XXVII.

HYPOCHONDRIASIS.

Hypochondriasis is, we very well know, a sorely troublesome disorder alike to patient and doctor. It is assuredly not self-limiting, but rather tends to rivet its hold on the system more firmly the longer it lasts. Its main feature is the presence in the patient's consciousness of some uneasy or distressing sensation, associated often with an apprehension of the existence of some malady with which he has somehow managed to get superficially acquainted, and which tyrannises imperiously over his mind with a sway that he seems quite impotent to resist. This apprehension is not a reasonable, well-grounded fear, but a kind of continuous panic not to be adequately accounted for. It takes the form in aggravated instances of fixed delusions, and the disorder is then verging on, if it does not actually amount to, insanity. Hypochondriasis differs from hysteria, to which, however, it presents notable resemblances, in being less multiform, less imitative of actual maladies, more constant to the guise it assumes, and having no tendency to proceed to convulsive seizures. Our difficulty in dealing with hypochondriasis arises essentially from the peculiar mental or psychical state of the patient, who is morbidly alive—hyperæsthetic—to his uneasy sensations, and to whom in consequence, in spite of all our assurances to the contrary, they have a terrible reality. It does not appear to me to become a sympathising and earnest physician to regard such a malady in a semicontemptuous and careless manner, as if it were of much less consequence than a blemish of the skin, a chronic rheumatism, a cough, or the like. His mind will recall the saying, "homo sum, humani nihil a me alienum puto," and he will rather endeavour thoroughly to investigate the essential elements of the morbid state, with a view to its cure, than pass it by as a vexatious annoyance not worthy of thoughtful care.

Two short records of cases, one in a male, the other in a female, may serve to illustrate the chief features of the disorder in its average intensity.

Case 1.—Mrs. C—, æt. 37, when she first consulted me February, 1865, had been ill 2 years. She had been married three years to a widower, but, strangely enough, had never consented to have connection with her husband the whole of that time, being afraid of having children. She seems never to have felt any sexual desire. There was no incompetency in her husband. She complained of smarting, itching, drawing pain at the mammæ, between the shoulders, and at the left side of abdomen, fancied there was a hard substance in the abdomen, and that there was great pulsation there at times. I could detect neither. She was as hyperæsthetic as she well could be. Her husband described her to me as utterly taken up with her morbid imaginations, and fears, and complaints. She had an extreme fear of death, and no persuasion seemed able to convince her that she had not some dangerous malady. At home she was utterly selfish, regardless of her husband's and step-children's comfort, took very little food, was very fussy about her house, and fatigued herself unnecessarily. Some time later she had a sensation like coals of fire at the top of head, and great giddiness, her nights were disturbed, she wandered and fancied all sorts of things. A year and a half later she was complaining very much of hot smarting pain felt inwardly about the left lower and mid part of abdomen close to the navel; she felt sore all round the hips and underneath the thighs, and in the sacral region of the spine. At the catamenial periods she passed clotted blood and slime, and had some red discharge in the intervals. So she affirmed, but on examination the os was found to be small and virginal, with only clear mucus exuding from it. The cervix was rather large, but except a white spot of altered epithelium at the left side of the os, which was always the same, it appeared normal. She lived in abject fear of having "cancer of the womb, or tumour, or something dangerous;" and at each visit she looked into my face with eager inquiring eyes, and questioned me again and again to know if there was not some mortal disease, replying to my decided negatives with the demand why she suffered such pains if there was no structural lesion, and quitting me at last with more than half a suspicion that I was deceiving her all the time. In November, 1867, the dread of cancer seemed to have subsided, giddiness and vague pains were most complained of. In April, 1869, she came to me with well-marked bronchial catarrh, but made little reference to the old trouble. The abdominal pain was at least once much benefited by subcutaneous injection. Strychnia and Bromide of Potassium were also, I think, serviceable, but nothing had fair play, the morale was so defective.

Case 2.—N. A. N—, æt. 75, a strong, compactly built man, of studious and regular habits, accustomed to smoke moderately, first consulted me about the end of November, 1865. A sister had died of calculous disease in the kidney. His chief trouble at that time was a neurosis about the neck of the bladder, as it seemed, obliging him to rise to micturate from 3 to 5 times in the course of the night. This, as it appeared from subsequent examination, did not depend on any enlargement of the prostate, and the urine presented no evidence of vesical catarrh. It was highly acid, contained no sugar nor albumen; the total quantity in 24 hours was about 20 oz., sp. gr. 1029, deposited lithates, but no oxalates. Belladonna at night had no effect on the irritability of the bladder, but an opiate enema was more beneficial, and he continued to use it for a considerable time, taking also in the day a mixture of Strychnia + Quinine, which toned him a good deal. The vesical disorder gradually subsided, but he then had trouble with his fecal evacuations, which he described as being hard, coarse, and excessive in quantity. Besides these complaints he had a more or less constant fear of diabetes, which sometimes completely tyrannised over him, and gave him a woe-begone, pusillanimous, distressed aspect. He had lost flesh to some notable extent, according to his own account, though he still weighed between 11 and 12 stone; and this emaciation and the occasional high sp. gr. of the urine (which he took usually twice a day, besides measuring the quantity) were the sole reasons he could allege for this morbid fancy. It was to little purpose that he was informed that the sp. gr. varied according to the amount of urine, and that the increased density in his case was demonstrated by his own figures to depend on a deficiency of water, not on any excess of solids. Distrustful of my assurances, and those of a good analyst, that there was no sugar in his urine, he had it analysed by Dr. Matthiessen, who reported to the same effect. Still he was but half convinced, and when he found in some medical works which he would now and then peruse some mention of symptoms which he fancied he experienced, all his uneasiness revived, and he became very miserable. It was plain that his literary labours were too much for him, and I often pressed upon the importance of having a thorough change and rest, by travelling on the continent, which I knew had agreed with him very well. He was very reluctant to do as I wished, but towards the end of 1866 went to Brighton and Paris, and got quite well; his weight in November was 169 lbs. In November, 1867, he was run over, his leg was hurt, and his fibula broken. The night of the accident and ever since he slept much better, had frequently 8 or 10 hours' uninterrupted slumber. This was the account he gave of himself in May, 1868, when I saw him on account of an attack of diarrhœa. In the course of June he became jaundiced deeply, the liver was small, the abdomen painless, the urine loaded with bile, and the stools pale. He died September 21st, and an autopsy showed that the liver was in a state of chronic yellow atrophy, the excreting ducts quite pervious. The hypochondriasis quite disappeared during the graver illness.

If we ask ourselves what malady such cases as the above approximate most to, the answer must certainly be melancholic insanity. Griesinger recognises this most fully, and says "in the aggregate of these mental disorders which collectively have the character of depression, hypochondria shows itself as a form of melancholia." And again, "the higher degrees of hypochondria gradually pass, not only into true melancholia, but even (are) complicated, with delusions." He has seen "some cases where the hypochondria appeared like an intermittent mania at almost regular periods, with intervals of several years." From the admission that hypochondriasis is a mode of insanity, it necessarily follows that the cerebral hemispheres are affected in a greater or less degree, that their normal nutrition is in some way deranged. When this occurs certain impressions, which in a healthy state of brain would be unfelt, or at any rate unheeded, act on the sensorium with great intensity, producing such modifications that other impressions take no effect and are lost. The brain seems to be hyperæsthetic towards certain impressions and anæsthetic towards others, somewhat in the same way as a sensory nerve may cease to appreciate pain or temperature, but still perceives touch. This view as to the altered receptivity of the hemispheres in various states of more or less decided insanity seems to me corroborated by the history which Gooch relates of a "deranged lady, whose predominant belief was that her husband was unfaithful to her; the notion, so far from being unreasonable, was, I believe, true, and she had known it for many years without unnatural disquietude, but now it engrossed all her thoughts; she neglected her ordinary pursuits, took a dislike to her friends, felt no interest in her children, and sat silent and motionless from morning to night. After continuing deranged several months she recovered, although she retained the same opinion." Gooch pronounces, I think rightly, that her insanity consisted in the overwhelming influence of the predominant idea upon her feelings and conduct. Her brain, it is evident, was comparatively tolerant of the distressing idea at one time, at another it was not.

But this being so, the practical matter to consider is how this morbid state of brain is induced, or, otherwise, what are the causes of hypochondriasis. We may group them in 3 sets, which are very much the same as we have noticed in other neuroses, viz. toxic, remote irritation, and neurolytic. Of the first we have a good example in the following history related by Dr. Gairdner. A gentleman, suffering under a severe attack of gout in both feet and one of his hands, requested his advice, and as he entered the room he saluted him with an apology for having some years before treated with disdain his opinion, and that of several other physicians, that he had the gout. He was then affected with the most miserable hypochondriacism. Dissatisfied with all regular physicians, he had for a long time betaken himself to quacks of every quality and of both sexes. But to such an extent had his wretchedness of feeling gone that he was watched with great care by his friends, who had endeavoured, not without reason, to obtain his seclusion in a madhouse. He had (at the second visit) considerable gouty deposits in the joints of both hands. His digestion was much disturbed. Urine not over-acid and perfectly clear. In the course of the previous summer he had drunk the waters of Recoaro, in the north of Italy (carbonate of iron), and recovered considerable strength. Soon afterwards Dr. Gairdner was called to see him in the state which he describes, and found him quite freed from his misery and all mental delusions. Trousseau says that certain '*etats vaporeux*' ('vapours') which are confounded with hypochondriac or hysteric affections are sometimes put an end to by attacks of articular gout. It is quite possible that there are various dyscrasic disorders more or less allied to gout, which may act as causes of hypochondriasis. That state of system which is associated with permanent oxaluria seems to be one of these. Slow mercurial poisoning, as Graves remarks, in consequence of frequent doses of blue pill, may render a man a confirmed and unhappy hypochondriac. This is a very possible result of "antibilious pill taking."

Remote irritation, according to Griesinger, is a frequent cause of hypochondriasis. It may depend upon slight diseases of the intestinal canal, of the liver, the genital organs, which give rise more to a feeling of general discomfort than to localised pains. Flatulence, and in particular gastro-intestinal catarrh, he avers, very often give rise to this malady in sensitive individuals, and that too often of a most aggravated form. Of this group of causes none are more efficient than chronic prostatitis, the so-called spermatorrhœa. A poor friend of my own, who was notably hypochondriacal, was affected, I believe, in consequence of prolonged suffering in early life from a neglected phymosis, and subsequently from a stricture of the urethra, determining chronic inflammation of the bladder. He had a lurking fear of growing 'fat inside,' which seemed to make him uneasy about eating, though he was by no means inclined to excess. Hæmorrhoids are mentioned by Romberg as occasionally the cause of the disorder;

and this may well be the case, as they are certainly very capable of producing troublesome symptoms in distant parts.

Neurolytic causative conditions are, of course, very manifold, though it does not seem that those which induce great prostration are the most efficient. Convalescents from fevers and influenza, though extremely debilitated, do not show much tendency to become hypochondriac. Hard study does more harm in this way, especially, perhaps, medical, where the student is very prone to imagine himself afflicted with the various maladies of which he reads. Illicit medical study often brings its own punishment in this way, and, like as the victim of alcoholic excess craves for the baneful indulgence, so the hypochondriac seems unable to restrain himself from perusing again and again books which describe symptoms which he fancies he finds in himself, and which are pretty certain to suggest to his morbid imagination some new danger. This unhappy tendency is largely *exploitée* by charlatans. The following instances are illustrative of the above statements. A man of great mental capacity and attainments assured me that at one time, after much hard work, he became so unnerved that he did not like to drive to the city in his brougham unless his wife accompanied him. I am well acquainted with the case of a gentleman who, while studying medicine, became haunted with the idea that his abdominal aorta was aneurismally dilated, and was pressing on the bodies of some of the lumbar vertebræ. He was quite aware of the delusive nature of the idea, and very sensibly endeavoured to shake it off by a trip into the country. This, however, entirely failed, and the morbid imagination prevailed to such an extent that his life for some time was rendered very miserable. Romberg says (Vol. II, p. 6) "The hypochondriasis of students frequently produces palpitation; and an instance of its occurrence from the same cause in advanced life is presented to us by Peter Frank himself, who, while devoting special attention to the subject of heart disease in Pavia, while preparing his lectures was attacked with such severe palpitations, accompanied by an intermittent pulse, that he felt assured he was affected with an aneurism. The symptoms only ceased after the completion of his labours, and after he had enjoyed the relaxation and diversion of a journey." The very opposite condition, tedium and ennui from lack of earnest employment, acts very much in the same way. Disuse has the same effect as over-exertion. The mind loses healthy vigour and robust tone, and abandons itself to sickly fancies, whose supervention seems almost retributive. It is related of an eminent surgeon that after he had retired to his country estate he became so miserable that he returned to London and resumed his practice. Such a want of self-resource betrays, however, a defective state of mind. Romberg states that an indolent, quiet, sedentary mode of life predisposes to it, and the more so if it has been preceded by great activity. Dangerous epidemics, he thinks, also act as exciting causes. During the prevalence of Asiatic cholera hypochondriasis was almost epidemic. My own observation would not confirm this. At such times various more or less grave and peculiar nerve disorders are unusually frequent, but none that I should regard as hypochondriasis. Arbuthnot, however, remarks that, during the whole season, influenza prevailing epidemically, there was a great run of hysterical, hypochondriacal, and nervous distempers. Azoturia may be mentioned as another very possible cause of hypochondriasis. The following is a good example of the influence of heat and malaria. A military man, who had gained the Victoria cross, and whose bearing corresponded to his well-earned repute, suffered on two occasions when I saw him with very perfect hypochondriasis. This showed itself first in a rooted persuasion that there was some insuperable obstacle to his bowels acting from disease in the abdomen, although there was really no serious constipation; and when this notion was dispelled, some months later he was as firmly convinced that he had inflammatory softening of the brain. Reading medical books was the sin which brought these particular troubles, though the nerve-disorder would probably have expressed itself in some similar morbid fancy in the absence of such suggestions. He had other more purely sensory troubles, as pain towards the left side of vertex, extending deeply, and connected with a dragging pain in the roof of the mouth and incisor teeth. He slept badly, but if he got good sleep his head was easier. The pain was worst in the early morning. He had often had fever in India, and the pains in his head commenced when he was weakened and depressed. Hydropathic treatment and Bromide of Potassium proved beneficial, the latter by procuring better sleep. There can be no doubt that the hypochondriasis and the neuralgia were kindred disorders, both originating in malarial nerve depression.

What has been already said relative to causation goes far to direct us in the matter of treatment. If the disorder be of gouty origin measures must be adopted which may induce it to assume a more regular form. These are in the main such as promote the general vigour and tone of the system. A suitable diet, change of scene, exercise, tonics, and certain mineral waters, are the remedies most likely to be successful. The mineral springs which may be expected to be serviceable are those which contain carbonate of iron—such as Spa, Pyrmont, Tunbridge Wells, La Malou, when the patient is anæmic; and Gastein, Teplitz, Wildbad, Buxton, and Bath, in cases of simple neurotic disturbance. When constipation exists, and the patient is not weakly, Carlsbad and Marienbad may be recommended. The suppression of imperfect articular attacks by colchicum or the like must, of course, be strictly forbidden.

Remote irritation, it needs scarcely be said, may be easily overlooked if not carefully sought for; the patient will very likely complain much more of some other symptom, and obtrude it on our notice than the one which it is really important to discover. A chronic catarrh of the stomach may give rise to severe hypochondriasis, without much distress being felt. The same is probably true of piles, constipation, and other visceral disorders. Though some writers discredit the possibility of urethral cauterization effecting the cure of spermatorrhœal hypochondriasis, I cannot agree in their view when I know how much general distress may be caused by a moderate sore throat, and how unfelt irritation may give rise to epilepsy or vertigo.

When the malady can be traced to neurolytic causes the means to be used are not materially different from those which have been mentioned under the head of toxic causation. The over-worked student or man of business must rest and re-create, the weakly man must be strengthened, the selfish and indolent must be invited to a better way of life. In the case of the latter the best effects may be expected from the prescription (if they can only be induced to follow it) of engaging in some work of charity or beneficence. A friend of mine narrated to me the story of some young officers who had been wisely and worthily occupying themselves by visiting on errands of benevolence among the distressed poor in the east of London, one of whom concluded with the remark, "'A couldn't have thought 'twould have done a fellah so much good!" This fine fellow had lit unconsciously on the wonderful truth which we see so frequently exemplified, that selfishness becomes its own sore punishment, while kindly care and consideration for others streams back with a blessed reflex on the heart from which it emanates. It is by no means necessary that the patient should attempt anything on a large scale, at any rate at first; attention to his own relatives, consideration for their comfort, endeavours to do something to make some one happier, if it be but by a few kindly words, will make a beginning which afterwards may be much expanded, and probably will as its salutary influence is felt. If his organs be sound the hypochondriac should try "to go mad"—I speak advisedly—after some bodily recreation. Let him hunt, or fish, or shoot, or yacht, or become a working member of the Alpine club, according as opportunity and liking lead him. Let him go into these sports *con amore*, get thoroughly interested in them, and beyond all doubt he will find his reward in complete oblivion of his nerve troubles, at any rate for some considerable time. Granted that in some of these pursuits there may be more or less risk—what then? Is there not danger in railway travelling—may we not catch infectious diseases in cabs, breed phthisis by breathing impure air, and invite insanity by fostering mental cobwebs? Better, I say, to be drowned in yachting, break one's neck in riding, or fall down from the Matterhorn (though really the risk of these casualties with proper precuations is but small), than live an abject hypochondriac. Let a man only keep his soul by God's grace from sin, and boldly face any ordinary risk which encounters him in the bounden duty of preserving a 'mens sana in corpore sano.'

It is worth mention that Mr. Dodson, from personal experience, gives decidedly the preference to mountaineering as a means of health. He says, "The use of Alpine expeditions is of similar character with that of a run across a stiff country, of a cruise at sea, of a hard day on the moors, or of many other exercises in which Englishmen indulge unrebuked. It braces the muscles, steadies the nerves, gives readiness to eye, hand, and foot, and fresh health and vigour to the whole frame; all, however, in a higher degree. Neither the breeze of the Atlantic, nor the clear air of the desert, nor the bracing atmosphere of Scotch hills or of English downs, can vie for one instant with the inspiriting life-giving breath of the glacier." He had been himself much depressed in health and spirits for two years, and all doctoring of every kind had failed. Before he left England it was pain and grief to him to crawl up a Malvern hill. Before he had been 6 weeks in Switzerland he made the ascent of Mont Blanc, and enjoyed it thoroughly. What an increase in vital energy this implies! Comparing a man with a steam-engine, it is like increasing the horse-power from 5 to 500. No man, however, can be a rule for others. The pursuit, to be beneficial, must be relished and enjoyed, and individual tastes must be largely allowed for. The beneficial effect of the mountain climate, says Dr. H. Weber, is especially felt in various forms of dyspepsia and dyspeptic hypochondriasis.

If, as too often happens, these re-creations are out of reach, I do not think drugs are to be despised. Strychnia, especially, used perseveringly for several months, may, with suitable diet and sufficient rest, accomplish a great deal. To many patients I should be disposed also to give etherised cod-liver oil.

CHAPTER XXVIII.

FACIAL NEURALGIA.

There are several varieties of this form of affection which it is practically important to distinguish. One is the sympathetic, or reflected, where the pain depends on some cause of irritation seated in a more or less remote part; it may be a decayed tooth, an over-acid stomach, a gravid uterus, intestinal accumulations. Another is where the pain is produced by some organic central disease, as in Romberg's well-recorded case. A third is where the pain is associated with marked tenderness, and where, judging from the "juvantia," we must consider the nervous disorder to be of a different kind to that which exists in other cases. It is clear that the conditions cannot be identical in cases which are cured by aconitine ointment, and those which yield to tonics. Fourthly, there are the instances which often are evidently produced by the special miasm which gives rise to ague, and which, when their causation is not so evident, are still attended with similar states of nerve debility, and are cured by the same means. These cases are sometimes markedly paroxysmal, sometimes show no periodicity. They are of very frequent occurrence in malarious districts; Schramm observed 195 in the course of four years at Bodenwöhr in the Palatinate. A transition between the two last varieties is exhibited in those cases referred to by Watson and Brodie, in which, after the pain has existed a long while, the affected skin becomes swollen, red, and exquisitely tender. In these it is reasonable to suppose that the paretic state of the cerebro-spinal nerves has extended to the adjacent vaso-motor, in consequence of which the skin becomes highly injected with blood, and swollen to some extent by interstitial effusion. Romberg terms the condition where the painful part is quite tolerant of pressure "anæsthesia dolorosa," which he regards as quite distinct from tic douloureux. Even in the fourth variety, however, there are many instances in which there is great tenderness of the skin without any vascular injection.

With regard to the first form of facial neuralgia, I have chiefly to mention that while we should always have an eye to its possible existence, and be on the look out for any indication of remote irritation on which it may depend, we should not be, in the case of suspected teeth, over hasty to have them removed. It has occurred to me more than once to relieve effectually by medicine neuralgic pain on account of which several teeth had been fruitlessly extracted; and, on the other hand, the presence of numerous decayed stumps in the jaws has not prevented my curing a distracting neuralgia of the face and head. Dr. Brinton well remarks,[1] "there are plenty of facts which suggest that lesions of nerves not necessarily painful may become so from causes originally by no means local. Thus, I believe, there are hundreds of people walking about London this minute, the diseased nerves of whose carious teeth would be speedily roused into severe neuralgia by two or three nights of sleepless watching and anxiety, or by two or three days of insufficient nourishment, or of violent and exhausting exertion of mind or body. And conversely I am sure that a generous diet will often relieve the agony arising from sheer involvement of nerves in a cancerous deposit."

The case related by Sir B. Brodie where a pain in one foot was immediately relieved by dilatation of a stricture of the urethra, which the patient had not even mentioned at first, affords a good example how latent and remote the real 'causa mali' may be in all cases of neuralgia and how carefully we should search for indications of it.

The following is a good illustrative instance, which is recorded by Dr. Mainwaring (v. 'Lancet,' Vol. II, p. 170).

Case 1.—A married woman suffered severely with pain in the jaws, teeth, and left side of the face, which had some resemblance to toothache, but was not at all relieved by having teeth extracted, and which gradually got worse during a period of 5 years. Iron, arsenic, and mercury, &c., were given at different times without producing relief. She was when seen a nervous, debilitated, suffering invalid. The affected side of the face presented a different appearance to the right in several particulars; it appeared smaller, was more pallid, and the outer canthus of the eye was drawn down, the eye itself being in form and size smaller than the other, and the saliva drivelled from the corner of the mouth. In other respects she was well formed. She complained of want of rest, and of the pain wearing her out; of irregular bowels—sometimes very costive, at others very lax; of loss of appetite; scanty and very irregular menstruation; pain and weight in the loins; leucorrhœa; frequent desire to pass water; and general suffering. On exposing the os and cervix to view by a speculum I perceived a large ulcer of the size of a crownpiece, or larger, extending over the os, and penetrating into the cavity of the uterus. The ulcer bled at the slightest touch, and was covered with a dirty-coloured matter. The nitrate of silver locally applied with suitable general remedies including entire rest in bed produced no improvement in the ulcer nor in the general symptoms in 3 weeks. The acid nitrate of mercury was then employed. On the third day following the application the ulcer presented a more healthy aspect, and the pain in the face was much easier; the patient had had some comfortable sleep, and felt altogether relieved. Eight days after the first application a second was made, and 3 days later the pain in the face had entirely ceased, and has not returned up to the present time. The ulcer also began to heal rapidly, the patient gaining flesh and strength daily. After nearly a month, however, convalescence was interrupted by attacks of agonizing pain in the region of the uterus and its appendages, extending sometimes to the right groin. Marked relief was afforded by cupping to the loins, and leeches to the cervix uteri, and by other remedies, and after 6 weeks the ulcer was healed, while the pain in the back and loins was much relieved, and the bladder acted normally. The paroxysms of pain were less frequent and intense, but, as there remained some hardness and thickening of the neck of the uterus, the part was well painted with tincture of iodine every 3 or 4 days. In 14 days the pains had quite left her, and the uterus had regained in a great degree its natural appearance and softness. After 3 months' absence for change of air she returned as well and hearty as ever she was, and she remained free from pain up to the time of the report. The eye and the cheek had regained their natural appearance, and she appeared cheerful and happy.

---

[1] 'Lancet,' April 11th, 1863.

Dr. Mainwaring thinks it possible that the later paroxysmal pain in the uterus depended on some nervous filament getting either exposed or implicated in the cicatrix during the healing process; certainly the pain was too brief and agonizing to be merely the result of inflammatory congestion. Yet there is no doubt that congestion did exist, and was relieved by the local depletion.

Friedberg records[1] four cases of severe pain in the face, involving in three all the divisions of the fifth nerve, and refractory to all internal treatment, which at length yielded to the extraction of one carious tooth. The remarkable circumstance was that other carious teeth had previously been extracted without relief, though they were painful and aching, while the tooth which appeared to be the cause of the neuralgia was painless. I would say generally that in all cases where the general health and strength did not appear much impaired I should think it very necessary to make particular inquiry after possible determining causes of the neuralgia.

---

[1] Canstatt's 'Jahresb.,' 1860, p. 25, vol. iii.

Oppenheimer[1] relates two cases of neuralgia of the fifth pair which obstinately resisted all treatment until the condition of the nasal cavities was investigated. In the first case a male, æt. 20, had regular paroxysms affecting all the divisions of the right nerve, which were cured by removing a nasal polypus that was accidentally discovered. In the second case there were very frequent and irregular attacks of ill-defined pains, which were materially relieved by zinc injections into the nasal cavities. These were not, however, adequate to curing completely the catarrh, which persisted along with the pains to some extent.

A source of severe facial neuralgia, not always easy of detection, is that frequently offended organ—the stomach. It has many queer caprices, as we all know, and one of them is to express its griefs by very various and not always very intelligible signs. A violent pain in one ancle (Wollaston's case), a severe pain in one foot (Brodie's case) have been immediately relieved by the removal of gastric irritation. The following case which Dr. Rigby tells illustrates the same as regards the face. While he was suffering under an intense attack of tic douloureux, in which opium had been used internally and locally without the smallest relief, it was suggested that he should take Carbonate of Soda in water. The effect was almost immediate; Carbonic acid was eructed, and the pain quickly abated. For nearly 2 years he continued liable to slight attacks whenever, by incautious eating or drinking, he deranged his stomach; but matters were invariably set right by the use of the alkali. Dr. Russell Reynolds also relates of an Epileptic patient who was subject to frequent and severe headache, that the pain was almost invariably relieved by a single dose of Potass. Bicarb.

A most highly interesting case, which seems properly to find its place here, is one related by Dr. J. T. Gilmore, of Mobile, in the 'New Orleans Med. Jour.'

Case 2.—The patient was a lady about 50 years of age, with a neuralgia of 8 years' standing, occupying the branches of the fifth pair of the right side, and the spinal nerves to a point as far down as the lower angle of the scapula. On the left side it was confined to the branches of the 5th pair. Her suffering was not continuous, but in paroxysms recurring every few seconds. Pressure upon the branches of the 5th pair of both sides would produce a paroxysm in these nerves. Both temples were considerably puffed, and there was some swelling at the lower angle of the scapula. No cause could be detected, except a fracture of the skull at the junction of the right parietal and frontal bones, received 25 years previously by the kick of a horse, and the repair of which had been left to nature, leaving a marked depression of the skull. The neuralgia, when it broke out 8 years ago, had been preceded by a burning and throbbing sensation at this point. It attacked first the branches of the 5th pair of the right side, subsequently those of the left, and then gradually extended down as low as the point indicated on the right side. On the right clavicle there was an eccentric enlargement situated about 2 inches from its sternal articulation that approached in size a pullet's egg, Appetite and digestion remained unimpaired. Looking upon the depression of the skull as the cause of the neuralgia, Dr. Gilmore determined to operate. After the removal of a button about the size of a silver quarter of a dollar he found that he had gone through nearly an inch in thickness of a bony mass, and around the internal circumference created with the trephine there remained a ridge that tapered off into the thickness of the healthy skull. There was, in fact, an external exostosis. The neuralgia subsided immediately after the operation, and, with the exception of two attacks of cardiac neuralgia which occurred within a month after the operation, she remained entirely well. The enlargement of the clavicle commenced disappearing after the operation, and there remains scarcely a trace. It resulted in Dr. Gilmore's opinion from excessive nutrition produced by neuralgia at that point (v. 'Brit. Med. Jour.,' 1867, May 11th).

---

[1] Schmidt's 'Jahrb.,' vol. cviii, p. 178.

The neuralgia in this instance resulted no doubt from irritation of the membranes and surface of the brain, affecting subsequently the origins of the nerves in which pain was manifested. The case is quite analogous to one of Epilepsy, or vertigo produced in the same way. A comparison of such instances shows very clearly what intimate relation may exist between disorders apparently very different, and marks very strongly the necessity for not resting satisfied with such diagnosis as consists in giving a trivial name to a case of disease without attaining thereby to any real notion of the true pathology of the symptoms.

With regard to facial neuralgia depending on central alterations of structure, I do not know how it is to be diagnosed unless there are existing symptoms of such disease, as paralysis of some limb or group of muscles. Inefficiency of all remedies would of course make it highly probable that some organic alteration was at the bottom of the mischief. It is, however, worth remarking that even in such cases remedies may produce a certain amount of benefit. Thus, in Romberg's case sesquioxide of iron and assafœtida at first proved very serviceable. In the case of a female[1] who had long suffered from intense pain in the balls of the toes, depending, as the result proved, on a bony tumour in the internal popliteal nerve, relief was always derived from arsenic though it was transient.

The third form must, I think, be rare; I have scarcely met with a marked example of it, though analogous hyperæsthesias in other situations are not uncommon. A typical case of this affection would, I think, occur in a person of tolerably good health and strength in whom tonics did not appear indicated. Such a one Mr. Skey's patient seems to have been whom he treated in St. Bartholomew's with aconitine ointment. He describes him as a fisherman, æt. 40, of dark, swarthy complexion, apparently of healthy constitution, and not intemperate (v. 'Med. Gazette,' vol. xix, p. 158). It is probable in cases of this class that two remedies which have been highly recommended for their occasional success may be expected to prove beneficial. I allude to muriate of ammonia and Croton oil. Mr. Skey found the former of more benefit in Mr. Spey's case than any other internal medicine, though the good effect soon failed. Barralier recommends it to be given *during* the paroxysm at half-hour intervals. It is a remedy which would certainly not avail in cases suitable for quinine and iron. My chief acquaintance with it is as a remedy for muscular rheumatism. I have found it useful in one case of abdominal neuralgia, but my experience of it as an antineuralgic is very limited. With regard to Croton oil our knowledge is purely empirical; we know that it has achieved great results in a few cases, but we have scarce any indications to guide us as to the state of system to which it is appropriate. *A priori* we may suppose that constipation and an absence of prostration would be prominent features of cases where it was to benefit.

The following case belongs rather to the transitional instances above alluded to, than to this form.

Case 3.—J. R—, admitted July 25th. Ill two months, worse last three weeks. Has pain from his chin to the top of his head, mostly towards right side. Is obliged to get up at night, sometimes thrice, and bathe his head with cold water to relieve the pain. Sweats very much at night. Feels very low so as to be unable to work at times at his trade (shoemaking). Pulse large, very compressible. Bowels open.

---

[1] v. 'Lancet,' August 11th, 1860.

Tongue clean and red. Never had ague, or lived in the way of it. The pain is sometimes relieved by pressure, at others increased. He was almost free from pain in a week after treatment was commenced, but he was still weak when he ceased attendance September 4th. In about eighteen months he came under my care again with the same disorder. He mentioned now that his head felt hot, he could hardly bear to lay it on the pillow it was so sore. After a fit of pain he trembled all over. He had six decayed teeth, but felt no inconvenience from them, except, perhaps, that he could not drink hot liquids. He ceased attendance much relieved in five weeks. In about two years he was again under my hands with the same symptoms—great soreness of the head, and inability to take hot ingesta into his mouth. He was quite cured in five weeks, and I have not seen him since (three years ago). His treatment consisted of quinine and iron, arsenic and belladonna. The latter seemed, perhaps, even more efficacious than the former. This man had very much of the stamp of aguish disorder upon him, as marked by great general debility, nocturnal sweating, and "cold shivers," which at one time succeeded each fit of pain. The cutaneous hyperæsthesia was well marked, but it yielded to the same remedies which subdued the pain. The presence of the decayed teeth did not prevent the final cure. The relapsing tendency of the disorder was very marked.

The last form is certainly far the most frequent, and corresponds with the most frequent forms of neuralgia in other localities. Schramm[1] finds the disorder to prevail much more in the female than in the male sex in the proportion of 136 to 59. In the former the disease increased in frequency up to the 30th year, in the latter up to the 40th. More cases occurred in the first than in the last six months of the year, 72 from January to April out of 195. The kind of pain varied very much, it was often attended with indications of vaso-motor paresis, injection of the eyes, redness and swelling of the skin, lacrymation and salivation. Most cases were apyretic, but in several there was shivering and fever, or shivering and sweating. Sometimes the neuralgia suddenly replaced a pneumonia, or a gastro-enteritis, or other inflammation. Supra-orbital neuralgia was always very obstinate. Arsenic was found an invaluable remedy in such cases, and where there was a tendency to relapse. It also appeared to be a specific in chronic inflammation of the eyes and of the lids. The treatment of this kind of facial neuralgia, and of similar in any part, may be thus formulated. Either quinine is to be given in full rapidly repeated doses until deafness or some other toxic effect is produced, and afterwards in smaller doses. Or, arsenic in doses of gr. $\frac{1}{20}$ dissolved in distilled water by heat is to be taken *ter die*, and extr. belladon. in doses of gr. $\frac{1}{2}$—gr. 1 *2dis horis* until either the pain yields, or disorder of vision and dryness of throat ensue. Both of these modes of treatment are thoroughly efficacious, but it is of little use in severe cases to adopt half measures.

---

[1] Schmidt's 'Jahrb.,' vol. ciii, p. 177.

Rheumatic neuralgia of the face corresponds less to the course and distribution of the divisions of the fifth, but seems more a peripheral affection. Cases, however, occasionally occur where it is impossible to distinguish the quality of the disease by the symptoms alone, and where we are unable to pronounce until we have employed the test of remedies. Often, however, the previous history affords us sufficient guidance. In any case where Potass. Iod. proved much more beneficial than quinine or arsenic we could hardly doubt the rheumatic nature of the neuralgia. About two years ago I had under my care an elderly lady who suffered severely with rheumatic neuralgia of the third division of the left fifth, which yielded to about gr. iiss. of Pot. Iod. with gr. iv of Ammon. Carb. *t. d.* It is worth mention that in her paroxysms the face was notably drawn to the opposite side, she had to use her hand to replace it. This is an example of reflex paralysis.

The following case is a good illustration of the fourth kind. I am indebted for the report of it to my friend Mr. Smith, of John Street, under whose able care the patient was.

Case 4.—Mrs. S—, æt. 39, mother of seven children, the last born nine years ago; she has never been pregnant since till last autumn (1856), when she miscarried at the second month. Is very stout and leucophlegmatic, circulation languid; left eye often somewhat everted, especially when she is weak and tired. Is hardly ever free from pain in the head. Comes of a nervous family; one sister, æt. 42, has never menstruated, and has now mental delusions; another has been quite epileptic for sixteen years, and is hysterical in the highest degree; a third is subject to neuralgia and has a cast in one eye; a brother is also neuralgic. Mrs. S— suffered at Hampstead, where she had been living several years, about fifteen years ago, a fearful attack of "tic douloureux" for weeks, and was only cured by Dr. Elliotson giving gr. xx doses of quinine till she was quite deaf; she was then quite cured. She has had slight attacks since, one rather severe at Marlow eight years ago. After miscarrying last autumn went to Scarborough for two months, and got pretty well. November 10th, 1856.—Has neuralgia of left side of face, principally in the situation of the mental nerve, of moderate severity. Quinine was given at first in rather small, subsequently as the paroxysms became more severe and of longer duration, in larger doses, until 48 grains were given in the twenty-four hours, when she became quite deaf, and the pain quite ceased (15th). The day before she was delirious and suffering fearful pain. This evening at the usual hour of paroxysm she had shivering, but no pain. For two hours there ensued an attack of hysteria with partial syncope only relieved by stimulants in large doses. 18th.—For the last three nights has had similar attacks coming on at precisely the same hour with shivering, but gradually decreasing in severity. The amount of quinine has been diminished, she takes 10 or 12 grains in twenty-four hours with as many drops of liquor arsenicalis. 22nd.—Hysterical attacks quite gone, slight pain in the face. She slowly gained strength, went to Brighton, and improved, but had still, in spite of quinine, slight returns of the disorder. Towards the end of the succeeding January she had neuralgia again in the same part, not paroxysmal, and not attended with shivering, but with some numbness extending down the right arm. The attack yielded to 24 grains of quinine in the day. Various external applications were tried as opium, chloroform, belladonna, Fleming's tincture of aconite, Morson's aconitine ointment, but none of them afforded so much relief as poppy fomentation applied almost boiling hot. *Remarks.*—There are several points well worthy of notice in this highly interesting case. (1) The liability of the patient by original constitution to derangement of the nervous system, and the affinity clearly indicated between neuralgia, epilepsy, insanity, and hysteria, all varieties of dynamic disorder. (2) The resemblance of the affection in many respects to disease of malarious origin; this resemblance depending, I believe, on the circumstance that the same structures are the seat of morbid action in both cases. Nerve debility, *however* produced, easily generates neuralgia. (3) The hysterical attacks which ensued as the neuralgia ceased, were evidently a part of the same disorder, and were subdued by a continuance of the same treatment. They were surely as much a physical disorder as the neuralgia itself. (4) The involvement of the hemispheres in the morbid action when it was at its height, and the cessation of both pain and delirium under the same remedy. The nerve and the nervous centre suffered alike, but expressed that suffering differently. (5) The evidence the case affords by the subsequent recurrences at intervals after the first attack that the remedy which proved so serviceable did not remove or destroy the cause of the disease, but simply rendered the system more capable of withstanding it. The long periods during which she was free from disease prove, I think, that it was not dependent on any structural lesion.

I have lately treated in a similar way a female, æt. 33, who had been suffering with facial neuralgia six months, and had taken quinine under medical advice without benefit. The pain occurred about twice a day in paroxysms of such severity that she became quite beside herself. She found that stooping forward so as to promote the flow of blood into the head relieved the pain. The pain was speedily arrested by quinine, gr. v *2dis horis* till her ears were buzzing. Other tonics were given afterwards and the improvement has been maintained. She attributed the attack to sleeping in a damp bedstead, but she had also suffered much mentally, which was probably the more efficient cause.

The following case illustrates the efficacy of the other mode of treatment alluded to.

Case 5.—H. W—, æt. 45, male, admitted under Dr. Markham's care, February 9th. He was suffering severely, and was very much relieved by iron and quinine, and a liniment of chloroform + aconite. His symptoms relapsed after resuming work at shoemaking. Dr. Markham kindly transferred him to my care, February 29th. His history was that he had been ill quite five months, with pain in face and head; he had some decayed teeth removed from left upper jaw, after which an abscess formed, but this is now quite well. The pain before the teeth were removed was toothache, not like the present, which he says is frightful, and worse than it has yet been. The pain is paroxysmal, it comes on the last three days about noon, and gets to its acme about 1 p.m., subsides about 5 or 6 p.m. It used to be very severe at night, but is not now. The pain affects both temples and all the top of head, is attended with a sense of opening and shutting, and with great soreness. The skin of the forehead is not more than just warm, not flushed or injected, but feels very tender. No pain now in eating. He feels very weak. Is not gouty, nor were either of his parents. Never in the way of ague. Tongue quite clean. Pulse feeble. Bowels open. Urine has been very thick. Pupils of medium size or rather small. No blue line on gums. Quin. disulph. gr. v 3*tiis horis*. Ferri carb. saccht. gr. xx *ter die*. March 3rd.—Head not at all relieved, pain seems to shoot through the brain. Pulse extremely feeble. Has not been made deaf. Acidi arseniosi gr. $\frac{1}{20}$. Aquæ destill. ℥ss *ter die*. Extr. bellad. gr. i 2*dis horis*. Olei morrh. ʒij *ter die*. 7th.—Was almost quite free from pain yesterday; not quite so well to-day; has taken about twenty of the belladonna pills, three yesterday; pupils not at all large; eyes very photophobic. March 21st.—Is much better; has scarcely any pain at all in head now; has gained flesh, but still feels weak on exertion; has worked three or four hours a day. Is a great deal stronger and better than he has yet been; has not taken any belladonna for some time. 28th.—Head quite free from pain; can't sleep at night for pain in *arms* if he works, but has no pain if he does not.

Dr. Declat warmly recommends the valerianate of ammonia in the treatment of neuralgia, and quotes the following remarkable case in proof of its efficacy.

Case 6.—A lady had suffered ever since she was 6 years of age with a most severe facial neuralgia. The pain first appeared on the occasion of her cutting a wisdom (?) tooth; the tooth was extracted, but without any relief of the neuralgia. She tried in succession sulphate of quinine, opium, belladonna, sulphate of strychnia, iron, gold, &c., and externally opium fomentations, blisters, morphia, chloroform, collodion, aconitine, &c. Mr. J. de Lamballe performed cauterization with a red hot iron in the course of the inferior maxillary nerve. This treatment diminished a little the acuteness of the pains without making them disappear; and although suffering less the patient could neither eat nor speak. She was obliged for at least 6 months to have recourse to nutritive injections and tonic baths to support her health and her life. Liq. Potass. Arsenitis ♏xij *ter die* produced a little improvement, but the remedy soon disordered the alimentary canal, and the disorder recurred. On January 3rd, 1856, a teaspoonful of the valerianate of ammonia taken in the evening rendered the night endurable; two teaspoonfuls the next day procured relief. On January 6th the patient was able to go out and converse. On the 19th she opened her mouth and began to eat. The dose was successively raised to ʒij night and morning; the improvement was so great that the countenance assumed a totally different appearance, and the appetite returned. At last, on May 6th, the pains having completely ceased for several days, the remedy was discontinued. From time to time some twinges of pain occurred, but each time the valerianate caused them to disappear, and Declat believes the remedy will retain its efficacy in case of relapse. The preparation which he employs is a brown liquid not very limpid, of a disagreeable taste, and smelling strongly of the peculiar odour of valerian; of this liquid he employs ʒj for a dose in continued neuralgia and hysteria, but he gives ʒij or even ʒiij in paroxysmal neuralgia at the period of pain. ('L'Union Med.' 1856, July 8th.) The drug is not much used in London, nor is it to be had everywhere. Mr. Blades, 85, Edgware Road, tells me that he prepares it from valerian root, by oxidation of the volatile constituents to form valerianic acid, and subsequent neutralisation with ammonia. It is a dark fluid having the characteristic odour of valerian root, with a slight excess of ammonia. Dose ♏xx to ʒj fl.

Neuralgia of the head may sometimes be complicated with very marked cerebral symptoms, as the following history shows.

Case 7.—M. A. C—, æt. 25, single, admitted October 8th, 1867. On admission the chief feature of her condition was stupor or semicoma. She could be induced with some difficulty to answer questions, but it was slowly and reluctantly, and not by any means always rationally or coherently. It was stated that about 10 years ago she had a fall and hurt her head, and that since then she had had violent pains in her head with sickness. During the last few days she had been delirious or wandering. Face pale; tongue coated; pulse 84, soft and weak; urine slightly acid, not albuminous, deposits phosphates when boiled, and lithates when treated with nitric acid. No spots on abdomen. Pupils rather large, about equal. Left lower eyelid is congested, left temple rather swollen. She was ordered two morphia-dressed blisters, one to the forehead, the other to the left temple, and Extr. Cannab. Indic. gr. ½ *ter die,* with sherry 4 oz. On 12th Zinci Valerianatis gr. ij were added to each pill. 14th.—Is very much better, looks brighter, eyes more lively. Says she cannot tell persons' names, though she knows them. 22nd.—Improving slowly, appetite poor, no pain in head. Mistakes pronouns frequently, uses *he* for *she,* and *vice versa.* Takes strychnia and cascarilla, and cod-liver oil. 26th.—Is still very pale and feeble, mopy, and inapt for exertion. Ferri et Quin. Citrat. gr. vij + Tr. Nucis vomic. ♏x + Aq. ℥j *ter die.* November 4th.—Much better, lips of better colour, is more cheerful and rational in manner. Discharged. The account which I received from the physician in whose family she had resided for 8 months before her admission was that she had been all this time very anæmic and delicate looking, and had suffered two attacks of head pain, besides that for which she was sent to the hospital. The first commenced soon after she came and lasted nearly a week, the predominant symptoms being intense pain in the left frontal region, with loss of appetite, but no feverishness, or impairment of mental faculties. The recovery was pretty sudden. About 3 months after she had another attack, which was rather more severe, but quite of the same character. Much relief on this occasion seemed to be afforded by Potass. Iod. gr. x *ter die,* and after she got better iron was administered for some weeks. During all this time the catemenia were regular. The third attack commenced October 3rd in the usual way, and two days later she became slightly incoherent for the first time. The left eyelid about this time became red, and slightly swollen, and there was increased lacrymal secretion. The next day she was decidedly more incoherent and rambling in her answers to questions, though she seemed to suffer less pain. Both pupils were dilated, and almost insensible to light, and continued so. On October 7th she was in a dull, almost semicomatose condition; made no particular complaint of pain, but was quite incoherent in conversation. The next day she was admitted.

The aspect of the symptoms in this case was at first rather formidable. My impression was that there existed some (probably rheumatic) inflammation of the pericranium, bone and dura mater, and that this was the cause of the pain and brain disorder. Subsequently, having regard to the manifest anæmia, and the absence of any positive indication of intracranial mischief, I formed and acted on the opinion that the primary disease was a neuralgia, and that the stupor was but an effect and extension of it. The early history quite justifies this view, and the success of tonic treatment corroborates it. In fact the pathological situation was this—a neuralgia of the fifth nerve, in a feeble subject, itself implying a quasi-paralysis of the tertiary centre, existing for some time separately, but afterwards extending to and involving the primary or cerebral centre in a similar morbid state. The dilatation of the pupils shows that some filaments of the third pair were affected in the same way. What would have been the result of treating this case on the view of "congestion and effusion?"

Dr. Anstie has recently ('Lancet,' November 17th, 1866) made some interesting observations as to the occurrence of actual erysipelatoid inflammation arising, so to speak, out of facial neuralgia. This is evidently an exaggeration or aggravation of the minor degrees of hyperæmia and tumefaction alluded to at p. 292, and its pathology is undoubtedly identical. If the view be accepted that the state of the cerebro-spinal nerves in neuralgia is one of paralysis, it is only what might be expected that the vaso-motor nerves which run in company with them, or, as some dissections I have made lead me to think, into which they pass, should be affected in the same way. The inflammation in Dr. Anstie's cases was accurately limited to the districts occupied by the neuralgia, which seems to have declined as the inflammatory disorder gained the ascendant. In the second instance related the inflammation affected the eye rather severely, producing opacities of the cornea, and some discoloration of the iris. In connection with this subject we may refer to a very interesting case recorded by Mr. Hutchinson. The patient, a man, æt. 63, had first slight conjunctivitis, then some pain in the scalp, then herpes in the painful part, which subsequently extended to the side of the nose and the upper part of the whisker (cheek). The conjunctiva became swelled, there was iritis with effusion of lymph and patches of corneal opacity. It is very interesting to note that the sensibility of the painful scalp (as tested by a pin prick) was sensibly diminished (v. 'Lond. Hosp. Rep.,' 1866).

Hemicrania is ordinarily regarded as a simple variety of facial neuralgia, and this Du Bois Raymond thinks is true of the great majority of cases. But from personal experience he is of opinion that it may depend not on a direct affection of the cerebro-spinal nerves, but on a spasmodic action of the sympathetic filaments which take their origin in the cilio-spinal region of the cord. The facts which lead him to this view are that he observes in his own case that his countenance is wan and pale, the temporal artery on the affected side (the right) feels like a hard cord; not so on the other, the right eye is small and reddened, the right pupil somewhat dilated, and the lowest cervical spinous process tender during the attack. Whilst he is at rest the pain is bearable, but on movement it increases fearfully, as also under all circumstances exaggerating the pressure of the blood to the head, such as stooping, coughing, &c. The pain is synchronous with the pulse of the temporal artery. The attack is brought on by fatigue, or over fasting, begins the following morning, culminates at midday, and departs towards evening. As it declines the right ear reddens, and becomes much warmer both subjectively and objectively. This Du Bois Raymond accounts for by relaxation of the vessels being consequent on their over-contraction. The observation now referred to is not a mere curiosity, it suggests the possibility of the nerve pain in some cases of neuralgia being the result of deprivation of blood, according to Romberg's elegant saying, that pain is the cry of the nerve for healthy blood, and as a necessary inference directs us to sedatives, or such like means which may relax spasm and promote blood-flow. I should like to know what would be the effect of atropia injection, a good dose of Indian hemp, and warm fomentations in an instance of this kind. At the same time I must say that I do not feel quite satisfied that the phenomena may not be otherwise interpreted. I well remember when passing myself through a typhoid fever that during part of the time I suffered severe pain in my temples from the pulsation of the artery, so much so that I would have been glad to have had it divided. This is one of the symptoms of Bois Raymond's case, but in my own I can hardly think that the artery was in a state of spasm, rather quite the reverse, as a hard pulse is unknown in typhoid. Pressure, if I remember right, relieved my pain, as it certainly did that of the smith whose case is related by Earle. ('Med.-Chir. Trans.,' Vol. VII, p. 187.) He was subject to violent pain in the frontal nerve whenever he exerted himself, but by contriving an apparatus to compress his temporal artery he was enabled to work all day long at the anvil. Trousseau relates that he has obtained some striking results in obstinate neuralgias of the head by division of the temporal or occipital arteries. Even where the neuralgia was not essential, but symptomatic of organic lesion (abscess) instantaneous relief has ensued. Trousseau does not pretend to explain the *modus operandi*, he only affirms the fact. ('Cliniq. Méd.,' Vol. II, p. 339.)

Division of the suffering nerve is a remedy which seems to have succeeded in a few instances, but has failed in many more. It can of course be useful only in peripheral neuralgia, and I should think in states of system when the general nervous power was not materially depressed. The nearer to the point of exit of the nerves from the cranium the section is made the more likely the operation will be to prove beneficial, but it will be also much more severe. It is not to be thought of until all other means have failed. J. Kühn[1] records an instance in which the inferior dental nerve was divided with apparent success, no relapse having ensued during six months at least. Ch. Frank[2] records five cases, in four of which the operation was successful. In the first, the second, and third divisions of the fifth were the seat of disease. The infra-orbital neuralgia was cured by division of the nerve at its exit from the foramen, and the mental by section of the inferior dental nerve before its entrance into the canal. In two other cases the infra-orbital and frontal nerve was successfully divided. In a fourth the supra-orbital and frontal nerves were divided with good results. In the fifth case the inferior dental nerve was twice divided, at an interval of above four months between the operations, but the result seems not to have been satisfactory. Bockel ('Gaz. des Hôpit.,' 1865) relates 2 cases in which portions of the gustatory and mental nerves were excited on account of neuralgia of the side of the cheek and tongue. In both the neuralgia was cured, at any rate for some months. Bratsch[3] gives the histories of nine patients, all of whom, except one, at the time of the report were freed from their sufferings. In several, however, the operation had been so recently performed that it was by no means certain that a relapse would not ensue, which indeed seems not impossible, seeing that the nine patients had shared no less than twenty-five operations among them, nearly three a piece. Eisenmann remarks that these cases support the view that idiopathic neuralgias are of central origin, and agrees in the opinion attributed to Sir C. Bell, that it is not the division of the nerve, but the operation and its influence on the nervous centres, which removes the pain temporarily or permanently. Trousseau seems to favour this view, and cites what seems an analogous case, viz., the cure of facial and sciatic neuralgia by section or cauterization of the helix of the ear.

Trousseau distinguishes epileptiform neuralgia, as he terms it, from ordinary facial neuralgia. The former is characterised by sudden violent darts of pain, attended in some instances with rapid convulsive movement of the facial muscles, lasting about a minute, but returning ten to a hundred times a day, with longer or shorter periods of exemption, varying in duration from days to months. The attacks are induced sometimes by any movement of the face, as in speaking, drinking, or eating. The suffering is terrible. No treatment cures effectually, but very large and repeated doses of opium procure, as long as they are continued, great mitigation of suffering, or even complete exemption. When the drug, however, is omitted the disorder soon returns. Section of the trunk of the nerve also affords great temporary relief lasting for days or even months, but the disorder recurs obstinately. Quinine is of no avail.

---

[1] 'Archiv. Phys. Heilk.,' iii, 1859, p. 226.

[2] Schmidt's 'Jahrb.,' vol. ci, p. 293.

[3] Const. 'Jahresb.,' 1860, p. 25.

LEEDS SCHOOL OF MEDICINE

LEEDS SCHOOL OF MEDICINE

CHAPTER XXIX.

FACIAL PARALYSIS.

The plan of my work excludes from notice under this head all cases depending on organic lesion. Inorganic paralysis in this situation has long been known, and designated as rheumatic. Trousseau[1] says that the action of cold is one of its most frequent causes, it surprises those whom it affects in the midst of most perfect health, and produces no derangement of the economy. A mere current of air, remaining in a damp place, as in a house whose walls are not well dried, is enough to give rise to it. Other causes are violent emotions, as terror, of which he gives an instance, anger, grief. Sometimes it comes on without apparent cause. Sudden supervention is a pretty constant character of this paralysis. J. Frank states that seven of his patients were suddenly attacked with this paralytic affection on putting their heads out of the window in the morning when it was very cold, though only for a moment. Romberg says, "it is very common for pain and tumefaction, accompanied by febricitations, to occur in the affected side of the face after the patient has caught cold; these symptoms disappear after a few days and the paralysis remains." The facts above cited illustrate and confirm, as it seems to me, the views already advanced as to the causation of paralysis. When the facial nerve is suddenly palsied by a "coup de vent," it is impossible to suppose that the cold has acted directly on the nervous filaments lying well covered with fat and skin. On the other hand, it is certain that the sensory nerves of the skin *must* be affected, and they produce the paralysis by a reflex inhibitory influence. When the affection results from excessive emotions, such as terror, whose enfeebling effect is notorious, the nerve-cells at the origin of the facial must be rendered paretic by a similar influence or shock communicated to them from the superior centres. The occurrence of quasi-inflammatory swelling in the affected side of the face, I should refer to a paralysis of vaso-motor nerves inducing hyperæmia of the part. The paralysis in rare instances affects both sides of the face (I am still confining myself to non-organic affection). Dr. Gairdner relates[1] and comments very instructively upon a case, which was entirely of eccentric origin. All facial expression is completely lost, and labial articulation also. According to M. Davaine, if the branches of the nerve given off before its exit from the stylo-mastoid foramen are paralysed there is also dysphagia, a nasal twang of voice, and impairment of lingual articulation. In the double paralysis the mouth is not drawn to one side as it often is in the single. The diagnosis of inorganic from organic facial paralysis is a point of much importance. Romberg asserts that they are often confounded. Trousseau admits it possible that a facial paralysis having all the characters of the disorder we are considering, may result from a very limited hæmorrhage in the mesocephale; though he adds that in all his practice he has never met with such a case. He grounds his admission on Vulpian's experiments, who produced facial paralysis in a dog by a small wound of the fourth ventricle. The distinguishing signs which Trousseau confides in are the possibility of closing the lids in all cases of facial paralysis from cerebral disease, and the retention of the electric excitability of the muscles, which is lost in the functional disorder. In most cases of cerebral disease the facial paralysis will be associated with hemiplegia or other symptoms. If the facial nerve be involved in disease of the petrous bone, or have received traumatic lesion, the nature of the case is generally sufficiently clear.

---

[1] 'Clin. Med.,' vol. ii, p. 286.

If there be any indications of inflammatory action in the vicinity of the parotid gland we may apply a few leeches and purge. If, as usually happens, there are none, the interrupted current should be passed for fifteen minutes daily along the track of the paralysed nerve, and stimulating embrocations should be rubbed on the skin of the face. Strychnia may be administered internally, or, as Trousseau recommends, endermically. In exceptional cases the paralysis gets well in twelve or twenty-four hours of itself. Some cases, however, resist all treatment, though there is apparently no organic lesion. In some cases refractory to other remedies we may employ the continuous current. Schulz[1] has succeeded in curing six cases of grave facial paralysis by this means. When the paralysis has been considerable and of long duration it is apt to be followed, as in analogous instances, by permanent contracture to a greater or less extent of one or more of the facial muscles. Here we observe again the affinity between paralysis and spasm.

---

[1] *v.* 'Lancet,' May 18th, 1861.

I subjoin an illustrative case.

Case I.—J. E. L—, æt. 22, male, admitted May 11th, ill one week. Has paralysis of the right facial nerve, the eye cannot be closed, and the cheek is puffed out in expiration. He can close the mouth, but not so perfectly as normally. No numbness of skin of face. Hearing of right ear good. The affection came on quite gradually, after exposure of the right side of the face to a draught two days before. No pain in head. Some bad teeth, but none ache. He was faradized once, used linim. terebinth. to the face, and took strychnia, and was all but quite well in a month. He improved materially with the liniment and one galvanization in the first three days.

In a case of a man, æt. 68, under my care, in whom the left side of the face was paralysed, there were some points deserving notice. Thus, he had quite lost his smell, which may have depended on a previous catarrh he had contracted. Trousseau, however, states that one of his patients, just before his face was paralysed, found his taste impaired—his food tasted like salt plaster, as he described it. It does not seem impossible that the morbific cause might affect another nerve as well as the facial.[2] The left eye in my patient 5 days after the commencement of the paralysis became bloodshot, with notable subconjunctival ecchymosis. I interpret this as a result of vaso-motor nerve paralysis affecting the capillaries of the part and impairing their texture. The same thing occurs sometimes in aguish disorder. I believe my patient's primary malady was rather of this kind, as he complained of a symptom which is not uncommon in such conditions, viz. waking up at night in profuse sweat and then turning very cold. Another peculiarity was that the uvula was positively drawn to the left, the paralysed side, the left arch of the palate was distinctly the narrowest; this symptom continued to be evident at the end of the first month. Of this contrariety to the usual event I can give no account. Both arms and hands had been weak and stiff 7 weeks before the facial paralysis appeared, so that he could not pursue his occupation of carpet-beating; this symptom continued a month or more while he was under treatment. It as well as the paralysis ultimately got well with faradization and strychnia, the dose of the latter being gradually raised to gr. $\frac{1}{7}$ *ter die.*

---

[1] 'Wiener Med. Wochenschr.,' No. xxvii.

[2] This was very evident in a case recorded by Brown-Séquard, where the right hypoglossal, glosso-pharyngeal, and auditory, as well as the facial, were more or less affected (v. 'Med. T. and Gaz.,' March 14th, 1863).

CHAPTER XXX.

RETINAL HYPERÆSTHESIA.

Romberg denies that intolerance of light is dependent on an affection of the optic nerve, for this nerve is incapable of receiving any other impression but that of light and colour, and its hyperæsthesia is manifested exclusively by luminous phenomena, as its anæsthetic conditions show themselves by an inability to perceive light and colour. He therefore denominates the photophobia, which forms so striking a feature in the common malady termed scrofulous ophthalmia, ciliary neuralgia, though he seems to admit that the functions of the optic nerve are disturbed in this affection. He fortifies his view by the fact that amaurotic individuals may suffer from photophobia. These opinions have been very generally received; but, nevertheless, I feel it very difficult to think that when a person finds the ordinary light of day to affect his eyes with a peculiar sense of distress, not ordinary pain, which is only relieved by complete darkness, that the retina is not the essential seat of disorder. Dr. Mackenzie, speaking of scrofulous conjunctivitis, says "that the admitted light seems to the patient to blaze like the rays of the sun reflected from a mirror;" and with regard to another set of cases, where the original irritation appears to be in the retina, the disorder having been brought on by over-use of the eyes, he writes as follows:—"The intolerance of light is often excessive; we find the patient in a room totally dark, with his eyes tied up; he cannot allow them to be examined, and compares the sensation he experiences from attempting to open his eyes to what might be felt on looking at a sea of molten gold. In one young gentleman in this state by whom I was consulted the attempt to open his eyes often seemed ready to throw him into a state of general convulsion." Mr. Tyrrell states that "in a few cases of long-continued and severe scrofulous inflammation of the conjunctiva, attended by great intolerance of light at the early period, I have known the sensibility of the retina frequently affected, and in one instance destroyed" (p. 163, Vol. I). This evidence seems to me conclusive as to the essential concernment of the retina. At the same time it is very possible that the ciliary nerves are involved, and express pain in their own way, and perhaps the state of the retina may be, in a measure, dependent on their irritation, the photophobia then taking the position of a reflex neurosis. Mr. S. Wells says, speaking of scrofulous ophthalmia, that the photophobia often proves very obstinate and intractable, but, as a rule, less so than when the cornea is also implicated, *i. e.* when the ciliary nerves are more irritated; and on the same ground a compress and bandage often relieve rapidly intense photophobia by affording opportunity for the regeneration of the corneal epithelium. Yet it seems as if one could hardly credit the existence of severe ciliary neuralgia where there was no other symptom than photophobia. Romberg says that the pain not unfrequently extends over the head and face. On the other hand, I am sure that severe facial neuralgia may exist without the production of any notable photophobia; in fact, I do not remember ever having observed such a symptom in patients tortured with this malady. It does, however, exist in some. Dr. Anstie relates a case where it was intense. In this, however, erysipelatoid inflammation coexisted. Mr. Hutchinson has also recorded a case of intense photophobia from acute corneitis in a patient perfectly blind, owing to white atrophy of the optic nerves. Mr. Soelberg Wells admits hyperæsthesia of the retina as an independent morbid state, occurring generally in young persons, especially in females of a very excitable, nervous, and hysterical temperament, and in delicate, feeble health. "The retina is extremely irritable, and the patient is greatly troubled by photopsies, such as bright, dazzling stars, coloured rings, &c., before the eyes." The retina also retains impressions for an abnormally long period; but it is remarkable that while visual power in its central part is perfect, the peripheral portion is anæsthetic, so that the field of vision is contracted. (Wells.) He cites from Mooren "an extraordinary case, in which the sensibility of the retina was so greatly increased, that the patient could read large print in the dark, in which a normal eye could not distinguish a letter."

It is well understood at the present day that photophobia is no sign whatever of the existence of ocular inflammation; that it may be most intense when traces of inflammation in the outer and inner coats of the eye are null, or are altogether insignificant. Retinitis does not give rise to marked photophobia. If further proof of this were needed it would be found in the results of Gräfe's treatment, and in a history related by Mr. Hutchinson. The former has obtained surprising results, as Mr. Wells states, when all other remedies have failed, by repeatedly plunging the children's heads under water. The latter had a little girl under his care suffering with an ulcer on each cornea and intense photophobia. Her mother had never seen her open her eyes for 14 days. She kept the lids screwed up and the face held down. One day she was out walking with her sister, and, keeping her eyes closed, fell into a hole, and was much frightened. For 6 hours after the fright she kept her eyes wide open, then the photophobia returned with the same intensity as before.

The symptoms which we have been specially considering is so remarkable, and may so well be taken as an example of hyperæsthesia in other situations, that a review of the remedies found most efficient in the disease where this retinal affection especially prevails cannot but be interesting from its relation to the management of the same or analogous states in other parts. We may enumerate them as follows:—(1) *Removal of existing irritation*, as by clearing out the bowels, neutralizing over-acid secretions in the stomach, curing a diseased state of the Schneiderian membrane, preventing the administration of unsuitable food, keeping the eyes at rest by a compress so as to prevent friction, in some severe cases by confining the patient for 6 or 8 days to total darkness, or by shading the eyes with blue glasses. (2) Where we cannot remove the irritating cause we may be able to calm the morbid action by *sedatives*. Such are subcutaneous injection of morphia (v. a good case 'Brit. Med. Journ.,' 1865, June 24th, p. 640), aconite, or belladonna lotions, or the cold eye douche, with carbonic acid water, or a current of carbonic acid gas, or moist warmth, either alone or aided by lead lotion. The same intention may be fulfilled by sedatives acting through the general system, as inhalation of chloroform or ether, the internal use of belladonna, aconite, tartar emetic, or Dover's powder. Dr. Mackenzie says, "There is, perhaps, no remedy in the whole materia medica which possesses equal powers of a sedative kind as tartar emetic in this disease." Bromide of Potassium might probably be no mean addition to this list. (3) *Tonics* also render very important services when evacuants have been premised, and the system is not too excitable. (4) *Stimulants applied topically*, as Dr. Mackenzie says, often act as the best local sedatives, if applied *after* the acute inflammatory excitement is subdued. Before this is effected they will scarcely fail to prove hurtful. A 4-grain solution of Arg. Nitras, Ungt. Hyrdr. Nitrico-oxyd. and Vin. Opii are those he most approves.

The principles involved in these precepts seem to me to apply exactly to the whole range of neurotic disorders. Change the retina for the hemispheres, and we still recognise the importance of proceedings of a very similar kind. Nay, the very same means often avail in the hyperæsthesia of the latter (delirium) as in that of the former. If tartar emetic is a valuable sedative to the retina, so it often is to the brain; if chloroform inhalation sometimes serves as well in hysterical and epileptic delirium, it does so also in photophobia; if the cold douche is useful in the one case, it is also in the other; if removal of remote irritation is needful in the one case, it is equally in the other; and the good effect of topical stimulants seems to have a good deal of analogy with that produced by alcohol taken internally, which undoubtedly finds its way in large quantities to the brain. *Mutatis mutandis,* any hyperæsthetic organ, brain, stomach, uterus, or any other, is to be dealt with quite in the same sort of way.

I subjoin the following histories as affording hints for the management of some difficult cases, in which photophobia constitutes a more or less principal feature.

CASE I.—J. S—, æt. 10, male, admitted April 7th, with strumous ophthalmia and treated with F. + Q. citr., ol. morrh., collyr. bellad., and blisters till 22nd, when he was transferred to my care. He had then extreme photophobia, such that he had not opened the left eye for four months, the right eye was almost as bad. He kept his hand constantly pressed over the eyes. He had suffered with the disorder for six years more or less since he had had hooping-cough. Pulse weak, jerky. Tongue clean. Bowels costive. Quinine + iron + tr. aconite (the latter in ♏vj doses) *quater die,* strychnia + iron + hydrocyanic acid, ol. morrh., lead lotion, blisters, occasional leeching, small doses of morphia gr. $\frac{1}{3}$ *ter die,* the same with ferri carb., tannin + opium, emetics, and tr. ferri mur. ♏x 2*dis horis* were given till March of the following year, when he was nearly well, and remained so, or rather improved still further till May 6th, taking ferri ammon. citr. + ammon. carb. + inf. calumb. He then ceased attendance. Of all the above remedies, which were pretty fairly tried, there were two which produced signal benefit, so much as to make it worth while to notice them particularly. The first was tannin given in doses increased to gr. x *ter die,* with liq. opii sedat. ♏v; under this the eyes almost perfectly recovered, and remained well for a month; he was able to face the light well, and was in the open air all day long. After getting a wetting he relapsed, and the tannin failed to restore him. For a month he then took ferri pot. tart. and ol. morrh., but with no gain. I then gave the tr. fer. mur. ♏x

2*dis horis*, determined to see what a "coup sur coup" treatment would accomplish. In fourteen days he was able to bear the light quite well, and during the remainder of the time he was under observation (three months) no relapse occurred. I have no wish to exaggerate the efficacy of these remedies, and have no expectation that liberal tanning and ironing of the system will always or often be requisite. I should generally expect more good effect from a pure bracing air. Still I think the above example may be worth remembering in dealing with obstinate cases. The amount and frequency of the dose of a remedy are most important items for consideration, and are often by no means sufficiently regarded. Treatment may entirely fail from this cause alone.

CASE 2.—A. A—, female, æt. 10, admitted July 26th, 1860. Had measles in April, has been ailing ever since. Skin cold. Pulse weak. Extreme photophobia of both eyes, the lids red externally, much lacrymation. Tongue clean. Appetite indifferent. Bowels open. Tr. ferri mur., with acid. hydrocy. dil., the same with morph. muriat. gr. $\frac{1}{5}$ *ter die*, powdered bark and soda, tannin + opium, tannin, colchicum + henbane, belladonna alone, and with iron ol. morrh., tr. ferri mur. 2*dis horis*, continued till February 18th, 1861, failed to do any good; the photophobia was as extreme as possible, and there was very extensive redness and excoriation around both eyes from the constant irritation of the discharge. She now began to take ferri ammonio-citrat. gr. v + ammon. carb. gr. ij + tr. nucis vom. ♏v + inf. calumb. ℥j *quater die*, which she continued till July 8th, when the eyes were quite well, except a slight film of opacity on the cornea. She improved steadily from the time of commencing this medicine. She was seen again November 21st, the eyes continued well, she had been in the country. These two cases were as nearly as possible exactly alike, save the difference of sex, yet the remedies which had availed most in the first were useless in the second. It seems to me that such experience as I have just recorded, which, of course, is frequently paralleled, affords us some valuable guidance in dealing with other disorders whose nature is more obscure, as epileptic affections, or other neuroses. It seems as if, though the *kind* of remedy is clearly indicated, it is a matter of exceeding difficulty to find that which shall be exactly appropriate to the particular instance. Not only so, but the amount of dose is a matter of material moment. I have seen a sixteenth of a grain of strychnia *ter die* cause considerable stomach disturbance, while one twentieth was well borne and cured. Where nervous tissue acquires an extreme susceptibility it is no easy matter to adjust a remedy so as to tone and calm without injuriously exciting—and this is what is wanted. If these points were well considered, we should have fewer sceptics with regard to the virtue of remedies. In a third case, the patient, a female, æt. 23, of marked strumous diathesis, all whose family were consumptive, was treated for more than eighteen months with a great variety of remedies, iron + quinine, strychnia, bark + soda, tannin, colchicum in full doses, aconite, tr. ferri mur. ♏x 3*tiis horis*, with occasional blisters, leeches, and various sedative collyria, but without permanent relief; even two or three months of country air failed. She was then admitted into the Charing Cross Hospital, where she took bark and iron, and had the eyes repeatedly vaporised with bisulphide of carbon. This appeared to cure; I saw her some good while after she had left the hospital without any trace of the photophobia, which had been very great, but with a very opaque right cornea. As her circumstances were tolerably good, and she had had the fullest trial of internal remedies, it seems fair to ascribe the cure rather to the bisulphide than to the rest and nursing of the hospital.

The following case, though not identical with the foregoing, has much in common and is of practical interest.

Case 3.—W. O—, æt. 38, male, admitted June 18th. Suffering with his eyes for seven months; for the first three or four he was at Moorfields, during the rest of the time he has been under the care of an eminent ophthalmic surgeon. He had been treated since April 26th with an issue in the temple, liquor cinchon., bark + soda + colchicum, pot. iod., opii gr. ½ *ter die*, ungt. hydr. c̄ opio, hydr., c̄ cretâ gr. iij *ter die*, besides leeches on three occasions. He was still, however, in a very suffering state when he came under my care, had been unable to work at his business, that of a carpenter, for seven weeks. The right eye could not bear the light, but appeared healthy. The left eye was in a state of marked conjunctivitis and sclerotitis, with great lacrymation, the cornea was cloudy, and the iris muddy. There was great intolerance of light, so that he was obliged to hold a kerchief to the eye, though vision was lost. The globe of this eye was very tender. He had pain at the forehead and back of head. When lying down he was easier. Urine natural. Bowels costive. Pulse exceedingly weak and soft. Tongue quite natural. Appetite good now, has not been so till last three weeks. Has been a teetotaller last twelve months, used to drink hard before. I had the great advantage in treating this case of knowing that the best means which could be employed had been fully tried, and that by the most skilful hands. It was, therefore, clear that it was useless for me to attempt to deal with it purely as a tissue inflammation. Whatever hope there might be of success must lie in endeavouring to improve the general condition of the nervous system, which was evidently depressed, and in calming the local hyperæsthesia. If this could be accomplished the inflammatory phenomena might be expected to yield also. I ordered him quinæ disulphat. gr. v *ter die*, and extr. bellad. gr. ¼ *ter die*. In five days he could see a great deal better, the pupil was less contracted, the iris clearer, the inflammation much reduced, the pain around the eye much less. He felt very nervous. June 27th.—He was ordered quinine gr. iij + tr. ferri muriat. ʒss + spt. æth.-chlor. ♏x *ter die*, and ten days later ol. morrh. was added. By July 21st he could see with the left eye every letter of his card, the cornea and iris had become clear, the photophobia had ceased, he had gained much flesh, and had been working for several days exposed to a hot sun. By August 21st he was well enough to be discharged, though he had passed through an attack of diarrhœal disorder. This case was treated on the principle of having regard to the pathological condition rather than to the local phenomena, and it may fairly be said that the result was satisfactory. The case proves, if proof be needed, that *some* inflammations are dependent upon nerve debility.

RETINAL ANÆSTHESIA.

This affection of the retina seems to be the opposite of the preceding. The following points respecting it seem to me well established. (1) It is not really night-blindness, it is not essentially dependent on the arrival of a certain hour of the day, but occurs whenever the subject is placed in a sufficiently weak light. (2) It is not dependent on organic change. Mr. Hulke and Mr. S. Wells have examined many cases without finding any change appreciable with the ophthalmoscope. (3) The causes which induce the disorder are of an exhausting kind, either such as act locally, exhausting the sensibility of the retina, or such as act through the general system. To the first belong exposure of the eyes to very bright sunlight, or to the glare of an expanse of snow. To the second bad and scanty food, malaria, tropical heat, fatigue, want of sleep, scurvy, self-abuse. The disorder, according to Ruete, occurs extensively in Russia among the poor during Lent. Not unfrequently the two sets of causes concur, as in sailors returning from tropical climates. (4) That the treatment must be chiefly directed to re-create nervous power, though stimulation of adjacent sensory nerves seems also a useful means, and absolute repose of the retina for a while may be essential. In this disorder we have, it seems to me, an excellent example of a functional paresis depending simply on an enfeebled state of the optic nerve. As it is definitely connected with the withdrawal of the natural stimulus of light, it cannot be imagined, I suppose, that the retinal arteries are in a state of spasm. Embolism is, I suppose, excluded by ophthalmoscopic examination. This, which seems the view generally held, is further illustrated by a case cited by Dr. Mackenzie, the subject of which the first night felt himself suddenly deprived of the use of his limbs and of his sight, but though totally blind he did not feel otherwise ill. In the morning his eyes and limbs were quite restored to their usual state. After this his sight alone failed at the close of the day, but he had no further paralysis of the limbs. There can be no question that the palsy of the motor centres in this patient did not depend on organic lesion, and the same may reasonably be concluded of the retina. The following quotation from one of the papers published by the Alpine Club is a good example of the effect of glare and fatigue:—"When we had pushed about half way down the glacier the sun sank beneath the horizon, and almost at the same moment K— announced to us that he was losing his sight. The long day's glare had been too much for his eyes, he could scarcely see the ice at his feet, and was as helpless as a child . . . . Happily as soon as we left the ice K—'s sight began to amend, and by this time (2 or 3 hours later) he could see quite distinctly." The recovery of visual power in this instance so soon shows clearly that the disorder had nothing to do with the night period. I have found myself the same cause produce a notable degree of drowsiness, *i. e.* a degree of *cerebral* anæsthesia. The following interesting history was related by Dr. T. Ballard, at one of the meetings of the Harveian Society. A young gentleman after a long day, during which he had taken little food, came home to dinner. He was suddenly seized with intense pain in the region of the epigastrium, probably the remonstrance of a wearied and neglected stomach. The pain subsided, and he proceeded to the dining-room, where he complained of being in darkness, upon which he was taken to bed. After some hours the darkness gradually changed to grey, and in the morning he saw again as usual. This was evidently a case of night-blindness brought on by depressing causes—fatigue, want of food, and pain. Pain, as I have argued, is a sensory paralysis, and the solar plexus pain in this case was the equivalent of the temporary motor paralysis in that cited by Dr. Mackenzie. As Mr. Erasmus Wilson, who cites the case, remarks, "the irritation of some of the filaments of the solar plexus transferred rapidly to the retina, produced an utter perversion of function." ('Journ. of Cutan. Med.,' No. IX, p. 99.)

The beneficial influence of repeated blisters, which seem to have been so marked in Mr. Bampfield's cases, must be referred, I think, to a reflex effect on the retina. The sensory filaments of the fifth pair were stimulated, and the excitement was conveyed through the centres to the anæsthetic retina, which was thus roused to action. This is very much what occurs when a galvanic current is passed through a district of skin supplied by the fifth nerve; the eye perceives a flash of light, although beyond doubt the optic nerve is not directly affected. In cases, however, where the state is rather one of exhaustion than of torpor repose is clearly more desirable than stimulation. Sooner or later tonics in almost all cases will be necessary, and the following instance seems to me worth citing, as showing what kind of treatment has succeeded in a very obstinate case.

Case i.—M. C—, a large stoutly built Irishman, had suffered with night-blindness over 3 months, when he was admitted into hospital. At this time there was some congestion of conjunctivæ and slight headache; the bowels had not been moved 2 days; no fever or excitement of the pulse; iris contracts or expands slowly; he could scarcely see at all at night even in bright moonlight. Cupping to the temples, purging, mercury to salivation, potass. iod., zinci valerianas, iron, quinine, strychnine, and blisters kept open were all employed with no beneficial result. He was then ordered Strychniæ gr. j + Tr. Opii ʒiij + Acid. Acet. ♏v + Aq. ℥iiss, M. ʒj *bis die vel ter.* When he began this medicine his general health was excellent, but the disease of the eyes had so progressed that he was somewhat worse than when admitted. He was totally blind after sunset, and could only see the brightest artificial light as a faint glimmer. The pupils at all times, but especially at night, were very widely dilated and contracted very slowly under the stimulus of light. Improvement began in less than a week after he commenced the strychnia + opium, and a few days after the dose had been increased he returned to duty cured, and has remained well 2 months. (Dr. Gardner, 'Amer. Journ. of Med. Sc.,' April, 1867.)

It is necessary to give remedies separately when we want to know what they can do singly, but when our object is solely to cure, combinations are often more efficient.

PARALYSIS OF THE RETINA.

Amaurosis, not dependent on organic lesion or toxic influence, may result from three causes, viz. commotion, exhaustion, and inhibitory irritation. Commotion of the retina seems to be very analogous to concussion of the brain, the immediate consequence in each case being complete deprivation of function, which subsequently may or may not be completely restored. Mr. S. Wells states that "the sight in these cases of paralysis of the retina often becomes perfectly restored, even although all perception of light may at first have been lost." In other cases, however, according to Mr. J. Z. Laurence, the patient, after a blow on or near the eye, becomes there and then partially or wholly blind, and never recovers any further vision. He relates several illustrative cases, of which the following is, perhaps, the most proving. A young woman was struck by the cork of a ginger-beer bottle on the left eye. This set up inflammation in the eye, which lasted about a week. I saw her about 2 months after the accident. She had never been able to distinguish even light from darkness since the accident. The pupil was somewhat dilated, but contracted slightly to light. A comparative ophthalmoscopic examination showed that, to all outward appearances, the fundi of both eyes were precisely similar and normal. ('Brit. Med. Journ.,' 1865, June 24, p. 635.) Mr. S. Wells' testimony is very similar; either there are no ophthalmoscopic symptoms at all, commensurate with the degree of blindness, or nothing abnormal is observed. The treatment advised consists of local depletion at first, and afterwards electricity and strychnia, or tonics.

Amaurosis from exhaustion is well exemplified in the following case cited by Dr. Mackenzie from Mr. Ware's observations.

Case 1.—Mrs. S—, æt. 30, after suckling her child for 6 weeks found her strength failing, so that she could not move about her house without experiencing a very painful languor. Her sight also failed, so that after a time the full glare of the midday sun appeared to her no stronger than the light of the moon. She also was affected with a violent pain in the neck, running upwards to the side of the head, on account of which 4 ounces of blood were taken from her by cupping. After this it was not long before she entirely lost the use of both eyes. After being 3 days in this state Mr. Walker, on visiting her, found both pupils very much dilated and remaining unaltered in the brightest light. He desired that the child should be immediately weaned, and gave bark and aperients, and had the vapour of ether frequently applied to the eyes and the forehead. Some slight improvement was produced by the 4th day of this treatment; and subsequently by the use of static electricity recovery went on rapidly, the sight mended daily, and in a short time was completely restored. The mode of electrifying employed was to place the patient on a glass stool and take sparks from the forehead and temples.

This case may be well compared with that of paralysis from the same cause as related at p. 108. Both I regard as examples of primary functional paresis. That either depended on arterial spasm does seem to me utterly improbable.

The following is an interesting instance of the sudden occurrence of amaurosis in both eyes, evidently of a functional character, and of its cure by strychnia.

Case 2.—A man, æt. 44, of good health, suddenly became completely blind on June 11th.—Dr. Saemann saw him an hour after the attack. His eyes had a normal appearance externally; his face was red; there was no hemicrania, no pain in the eyes, nor premonitory symptoms of paralysis. On ophthalmoscopic examination the fundus of the eye was seen to be healthy. Treatment by V.S., derivatives, &c., failed, and on June 18th Dr. S. injected subcutaneously $\frac{1}{40}$ grain of nitrate of strychnia to the left of the supra-orbital nerve. Two minutes had scarcely elapsed when the patient said that he could see the neighbouring clock and the leaves moving on the trees, and he could distinguish large objects. The hypodermic injection was continued every 2 days, the dose being increased to gr. $\frac{1}{10}$, and on July 3rd the patient could read No. 4 Jäger type with ease. (v. 'Brit. Med. Journ.,' 1866, May 19.) A similar case is related by Fremineau. (v. 'Med. Times and Gaz.,' 1865, January 21.)

Case 3.—In the early part of last year I had under my care a lady, æt. 77, who after a good deal of catarrh, probably influenzal, and an attack of threatening gangrene of the left foot, suffered with severe pain at the front and back of head, very intense, extending round the right side of the head only. After this ceased, she had numbness of the fingers of both hands, not constantly affecting the same fingers, and worse at some times than at others. Her sight, also, was affected; it did not appear misty, but she seemed to be in a twilight or semi-darkness, could not discern persons' faces at times so as to tell one from the other. On the morning of January 28th she did not know her grandchildren, but at 4 p.m. she was able to read with her glasses a moderate-sized print. Her eyes appeared normal, there was no strabismus; the pupils were rather small, and ophthalmoscopic examination by Mr. W. Cooper discovered no organic lesion. February 1st.—The report is, yesterday she had much sickness and prostration, and was painfully blind; to-day her left hand is extensively numbed, and her mental actions are enfeebled. 10th.—She seems feebler; her memory is failing; not much numbness in the hand; the dimness remains just the same, not varying at all with the degree of light. She cannot see to feed herself well, but she chats quite rationally. Appetite very bad, she feels squeamish. Bowels open, motions natural. The remedies hitherto used had been Strychnia + Ferri. Citras and Pot. Iod., with mild aperients. I now ordered Nitro-muriatic acid. February 25th.—She was very much better, her strength was much improved, and her sight pretty well restored. She says that she believes she was deaf as well as dull of sight; *now* she is annoyed by the pianos in the house (4 of them going at once), but when she was at her worst she was unconscious of them. She says she suffered no pain when she was ill, but now she feels so different that she begins to be aware how ill she was. I saw her again in December, when she could read a moderate-sized print easily, write her own letters, and read through volumes of 500 pages. In February or March, 1869, she died quite suddenly.

Though it is probable that the organs in this elderly person were more or less degenerated, I think the coexisting derangements, the deafness, mental dulness, bodily feebleness, and sensory numbness, all of which diminished very much along with the dimness of sight, can only be attributed to some general prostration of the nervous system, of a temporary and functional character, probably induced by influenzal catarrh. The benefit derived from the acid was remarkable.

The following is an instance of amaurosis from remote irritation, related by Mr. Howship. A middle-aged man, a ship-painter, had a small tumour on the crown of his head, which had existed 10 years at least. It had never been painful; but yet he thought his general health was giving way, as for some years he had been subject to headache, a complaint he was never afflicted with before. The frequency of the headache was increasing, and his sight had become so weak that for more than two years he had been totally unable to read even the largest and clearest print. On pressure no pain or even sense of feeling was excited in the tumour on the scalp. The tumour was extirpated, and from the description given of it I think there can be no doubt it was a common sebaceous cyst. Not more than an ounce of blood was lost in the operation, but the patient felt his head better the following evening than for many months before. He found his uneasiness and pain of head diminish from day to day, while his sight became much stronger and clearer. By the time the wound was healed he had lost all pain in the head, and his sight was so greatly improved that he was now able to read as small a print as he had 10 years before, nor did the pain in the head nor affection of sight afterwards return. (Mackenzie, p. 1077.)

The following case, recorded by Wecker ('Ann. d'Oculist.,' LV, pp. 130—144), is to the same purpose. A sempstress, æt. 28, had suffered for a long time violent pains in her upper jaw, and at last, after a violent paroxysm, she lost the sight of the right eye. Some days later, after a similar paroxysm, the sight of the left eye also was lost. When examined soon after, only slight indications were found of perception of light; the pupils were of medium width, did not contract when exposed to light. Ophthalmoscopic examination discovered nothing. Five carious teeth were removed on the left side, and some days later the left eye recovered its function, but the right only perceived differences in the amount of light. Three more teeth were now extracted from the right side, and the right eye soon regained its normal faculty. The patient also took some Valerianate of Zinc.

An intelligent layman told me that one evening he had got very heated at a debate of the House of Commons to which he was listening, and went out to a neighbouring confectioner's to get an ice. The first mouthful he swallowed rendered him stone blind, he could not see for some short time at all; but before long the blindness passed away, and he returned to his seat in the gallery and suffered no further inconvenience. He took, however, no more ice.

Tobacco and lead are well known to give rise occasionally to amaurosis. Besides removal of the cause, which is, of course, essential, the use of strychnia and other tonics is recommended in the former, and opium in the latter. I should, however, in any case of difficulty, not omit the administration of Iodide of Potassium in 20 grain doses *ter die,* well diluted, as advised by Dr. Fleming in ordinary lead poisoning (v. 'Brit. Med. Journ.,' 1865, Jan. 14th).

PARALYSIS OF VASO-MOTOR NERVES OF EYE.

The arteries of the eye are undoubtedly under the control of nerves derived from the sympathetic; and as the outer coats are but slightly yielding, especially in advanced life, it is very intelligible that any undue relaxation of the vessels conveying blood to the interior of the organ may be attended with serious consequences. Some change of this kind in connection with ciliary neuralgia (probably of gouty character) constitutes, perhaps, the essence of glaucoma. The following history may be related as a contribution to the pathology of such disease.

Case 4.—E. C—, æt. 31, married, after suffering more than 2½ years with frequent epileptic attacks and giddiness, became gradually affected with proptosis which, in March 1864, had existed 5 months, and had then become very marked. The globes were not nearly covered by the lids, they felt tense, and, especially the right, were notably injected, the lids were also very red. There was great fulness and bulging of the upper eyelids, and great pain in and above and behind the globes. This pain was much aggravated at night and destroyed her sleep. The visual power was pretty perfect; she could, however, not read long without the letters becoming confused. There was also very forcible pulsation of both carotids, and compression of one of them gave some relief to the pain in the eye. No thyroid enlargement. No palpitation. Ice applied to the eye and to the neck gave more relief than anything else, but it was only temporary; she fell asleep, but was soon aroused by the pain. The pupils were very small. The radial pulse was very weak and rapid, varying in the sitting position from 120 to 140. The urine was not albuminous. March 19th.—The right eye is in excruciating pain, much protruded, conjunctiva very red and quite dry, cornea dry and a patch of whity exudation in its substance. The pain in the eye she describes as dreadful, as if it would be forced out of the socket. There was great pulsation of the carotids. The left eye was also in much pain and red: the sight of this eye was pretty good, that of the other was lost. The next day the left eye had become more prominent, injected and painful, the cornea dull and covered over with vessels, and with a spot of exudation in its tissue. 28th.—Both eyes very prominent, conjunctiva of a deep red, chemosed with exudation in the anterior chamber or cornea. Soon after this both eyes were removed, abscesses having formed in both anterior chambers, and the cornea having been perforated by ulceration. The orbits were full of œdematous areolar tissue. I have certainly seen eyes as prominent as these were in patients who had exophthalmic goitre, but I never witnessed anything like the suffering there was in this case. No doubt the œdematous areolar tissue of the orbit caused most of the displacement and some of the pain; but the chief cause of the latter was, I believe, congestion of the globes themselves. This also produced, in my judgment, the exudation in the cornea, which led to the destruction of the eyes, though others consider this was caused by the irritation of the cornea. However this may be, there is no question that hyperæmia of the globes had existed and increased for a considerable time. This hyperæmia, I believe, depended on paralytic relaxation of the arteries, a condition which evidently was present in the carotids. The orbital capillaries, from being exposed to undue pressure, and having their retentive power probably also impaired in consequence of defective innervation, allowed the transudation of serous fluid through their walls, which saturated the areolar tissue. A tendency to hyperæmia of the head had existed before the eyes became affected; when she became giddy her head was dreadfully hot. That the proptosis, &c., was in some way connected with the Epilepsy I can hardly doubt; most probably the loss of tone in the ocular and orbital arteries was an exaggeration of that which existed in the intra-cranial vessels, and rendered the nervous centres morbidly excitable.

CHAPTER XXXI.

ACOUSTIC NEUROSES.

Deafness in the great majority of cases depends on some inflammatory mischief past or present. In low fevers it is probably a phenomenon of the same kind as the delirium, stupor, or semi-coma, and like them is to be referred to the disordered nutrition of the nerve-tissue induced by the morbid blood. This opinion rests chiefly on the deafness disappearing as it does in most cases as convalescence sets it, without any special treatment, and also on the acoustic anæsthesia, in such circumstances being replaced occasionally by hyperæsthesia. Sir W. Wilde, however, finds in the great majority of instances of typhus traces of inflammatory action in the membrana tympani; though he has also met with a few where the membrane was perfectly natural, and the tympanic cavity free. The latter have generally had a bad form of fever, with very severe head symptoms. In a bad case of typhoid under my care, which ultimately proved fatal from phthisis, deafness, stupor, and noisy nocturnal delirium were prominent symptoms. The deafness was not constant, it was notably less in the early part of the day, but increased after noon. This would hardly have been the case had there existed any actual lesion.

In some instances there seems reason to regard deafness as a neurosis. Sir W. Wilde states that "fright has suddenly deprived young persons of hearing, and that such cases are generally incurable." Dr. Todd relates in his 'Lumleian Lectures' for 1850 a case of hysterical coma in a youth, æt. 16, who was utterly insensible and unconscious for about 2 days, and continued apparently deaf and speechless for 3 weeks, after which he recovered under the influence of mesmerism, *i.e.*, spontaneously. Dr. Hutchinson (U.S.) reports the case of a German girl who at first had entire loss of speech, followed in 14 days by complete deafness. Two and a half years before she had hæmorrhage from the lungs in consequence of mental excitement, and on her voyage to America had several convulsions, (probably hysterical), but since then had been tolerably well. As remedies had no good effect she was etherised, to ascertain whether she was feigning. After the first etherisation she regained her hearing, and after the third her speech, but lost her hearing. A fourth etherisation produced no immediate results, but in the course of a few days she was able to hear loud noises, and later to understand what was said when spoken in a loud tone. Improvement after this was very rapid, and she soon recovered completely to her great joy. ('Amer. Quar. Journ. of Med. Sc.,' April, 1864.) Whatever quasi-hysterical manifestations there may have been in this case, I have no hesitation in accepting it as one of physical disorder, seeing that it was cured by a physical remedy, and that there seems no ground whatever to doubt the patient's good faith. Deafness is one of the manifold sequelæ of heat-stroke, and may be one of the most annoying. In a case I have long observed deafness and giddiness have been the most prominent symptoms, the latter being rather paroxysmal. The deafness has varied much in degree, sometimes the patient has been unable to hear his own voice, or the watch when it touched his ear, while at other times he could hear the tick 5 inches off. The left ear, which was at first the best, has become the worst. Fatigue increases the deafness, wine relieves it. Both the giddiness and deafness appear to me cognate affections, and I do not think that either of them are dependent on demonstrable organic lesion.

The cases above related may be taken as examples of primary functional paralysis of the auditory nerve; the following is an instance of inhibitory. A lady, æt. 54, spare, and of a nervous temperament, was attacked about 4 months before M. Vautier saw her with pain radiating into almost all the teeth, as well as into the muscles of the anterior and left side of the head. The eye of this side was in an almost constant state of lacrymation, and she had become completely deaf of this ear. She was sleepless and without appetite. After the extraction of the left wisdom tooth, which was a little loose and painful, the deafness immediately ceased and the neuralgia disappeared. We must regard I think these two disorders as essentially homologous, both reflex neuroses. The following case is highly interesting, as showing the production of the same paresis at no long interval, first by one kind of cause and then by the other. It is one of those recorded by Dr. Lever, in 'Guy's

Hosp. Rep.,' 1847. Three or four months after marriage deafness came on and gradually got worse, until at the time of her confinement the lady was unable to hear with distinctness any conversation that was going on in the room. Her temper also got worse, *pari passu* with the deafness. The day after her delivery her hearing was better, and it continued gradually to improve so that in 4 or 5 weeks she could hear as well as ever, and her temper and disposition were correspondingly improved. For 5 or 6 months she continued well, but then her strength began to fail, and it was evident that lactation was exhausting her. Her deafness also was gradually reappearing. Weaning, tonics, and change to the sea-side were prescribed, and she recovered. Here the auditory centre and some other parts of the encephalon were evidently deranged by impressions conveyed from the uterine nerves, during the gravid state of this organ. When these morbid impressions ceased, the organs gradually resumed their healthy play. There can be no doubt that the deafness would have been reproduced as severely as before, had the exhausting cause been allowed to continue in operation.

Acoustic hyperæsthesia, a condition quite analogous to photophobia, is well known to occur in hysterical patients, in some unfavorable cases of fever, in azoturia, and in some other states chiefly characterised by exhaustion. Sir Thomas Watson relates the case of a man dying of an irregular form of cholera, pulseless, cold, but with entire intellect and painfully hyperacute hearing. The treatment of all such cases resolves itself into that of the condition in which the symptom is met with. It is very remarkable that this hyperæsthesia, like so many others, is produced by causes which might have been rather expected to cause anæsthesia.

In the following case I believe the auditory centre is at fault, as the outer and middle ear have been pronounced free from disease by Mr. Hinton. A gentleman, æt. 50, first observed nearly a year ago a humming noise in the right ear, a low continuous sound. It was only heard in the evening and night, and not every night. It appeared to be connected with nerve exhaustion. Subsequently it was replaced by slight deafness of that ear, the tick of the watch being for the most part not heard plainly at a greater distance than 12 or 18 inches, but now and then being quite distinct at the full length of the outstretched arm, as it is on the left side. A six weeks' ramble in pure air removed the deafness for some good while, fatigue seems to increase it, but it has also seemed to alternate with giddiness. There can be no doubt it is essentially a functional disorder. It is attended at times with a sense of fulness, tension, and muzziness in the right ear. At present it has completely disappeared for 3 or 4 months. It commenced with a degree of "tinnitus aurium," and is no doubt allied to that affection when it is not dependent (as it so commonly is) on some morbid condition of the tympanum, or on remote irritation. A correspondent of the 'Lancet,' Nov. 17th, 1866, thus pithily describes his experience of tinnitus of this kind, which is not uncommon. "My first attack was I believe the first symptom of a slight attack of typhoid 7 years ago. It came on quite suddenly, and has continued without intermission ever since. There is no doubt of its purely functional character. Whatever gives tone to the nervous system always relieves. Deranged digestion, worry, or over-fatigue always aggravate this very distressing malady. Anæsthetics afford only temporary relief. The cold shower-bath every morning, resignation, and a determination not to think of or listen to it is the best advice I can give." It should not be forgotten that, as Sir W. Wilde says, a hair or a thin piece of hardened wax may cause the disorder.

AURAL PAIN.

As an addendum to this chapter, I may allude to some interesting cases related by Mr. Hilton in his very practical work on 'Rest and Pain.' One is that of a gentleman, æt. 63, who suffered with earache a good deal and had an ugly-looking ulcer, on the same side of the tongue. The ulcer had been aggravated by injudicious cauterisation, and appeared to have originated from the irritation caused by an adjacent rugged tooth. By keeping the tongue as much as possible at rest, washing the mouth with poppy fomentation and taking a little soda and sarsaparilla, about one third of the ulcer healed up in 3 days, and the earache much diminished. Subsequently the rough projections of the tooth were removed, and the patient lost all his unpleasant symptoms. This is simply a case of reflex irritation giving rise to pain, a very common occurrence, but nevertheless worth citing, as the cause had been overlooked and might be so again. The following case, which I take from the same source, is further important as indicating that actual organic alteration may be produced in the same way. The late Dr. A— had some years ago a very offensive discharge from the auditory canal of one ear, which annoyed him very much, and below the external ear there was a small enlarged gland. Various applications had been used without effect. On examination a slight ulceration was found upon the floor of the affected auditory canal. There was also a diseased molar tooth in the lower jaw of the same side. That tooth was extracted, and in a very short time the ulcer healed, the discharge from the meatus ceased, and the enlarged gland subsided. Mr. Hilton also gives a case in which it seems very probable that a decayed and painful molar on the left side of the lower jaw occasioned not only great pain on the left side of the face, but rendered the hair of the left temporal region nearly white, the rest of the hair being black.

LEEDS SCHOOL OF MEDICINE

CHAPTER XXXII.

THROAT DYSÆSTHESIA.

This affection is a neuralgia differing in no respect essentially from the same disorder in other parts. It is certainly at least in its well-marked forms of rarer occurrence. From the peculiar susceptibility of the throat a dysæsthesia of this part produces considerable distress. Patients complain of feeling as if they should be choked, and the sense of impending suffocation is sometimes very urgent, of dysphagia, of a sense of heat, dryness and burning. The throat on inspection is found either normal, or but slightly inflamed, and the nervous distress is out of all proportion to the visible alteration if there is any. The patients are mostly females, but the affection is quite unconnected with hysteria, in so far as that term is intended to imply a tendency to simulate or exaggerate disease. Where a rheumatic element can be discerned pot. iod., or ammon. muriat. should be given, generally with bark or ammonia on account of the existing debility. If the neuralgia appear to be simple quinine and iron, with ol. morrh., and sometimes arsenic steadily administered will effect a cure. For some illustrative cases I refer to the 'Med. Times and Gaz.,' May 2nd, 1863. The following is of the same character:

Case 1.—E. G—, female, æt. 36, married, admitted November 5th, ailing three years, ill one month. Complains of pain in the neck and head, of a sensation of swelling in throat and tongue; wakes up at night with palpitation of heart, and a sense of being very ill, attended with choking. From 8 to 12 p.m. a feeling comes over her as if she could hardly keep life in her, it seems to proceed from the left hypochondrium, causes palpitation, and takes away her speech. Throat is not at all sore. Has no dyspepsia. Is weakly. Heart's action a little excited. When first attacked she was purple all over, and seemed to be dying, had then been up three nights nursing. Brandy relieves her. Ordered F. + Q. Citrat. gr. x + tr. nucis vom. ♏xij + aq. ℥j *ter die*, and subsequently ol. morrh. On this treatment she has improved in a very marked manner. December 3rd she was better a great deal. January 11th.—Has been up at night nursing a sick child, disorder relapsing.

The following case was a remarkable one:

Case 2.—Mrs. ——, æt. 21, had been ailing since her marriage 4 years before I saw her. No children. Some inflammation existed about the os and cervix uteri. The catamenia were rather profuse, but she was not at all anæmic or debilitated. I felt suspicious of syphilis, as she had some indefinite eruption, her hair had come off a good deal, and she had had "lumps in her neck." From the first she made some complaint of her throat, but it was not until some 7 months had passed that attention was specially directed to it. She described herself then as suffering very much with her throat, which woke her up two or three times in the night, the mouth, and lips, and pharynx becoming very dry. In the morning she spit up large pieces of phlegm, and her mouth was often clotted with lumps of black blood. She always felt as if there was something about the thyroid or cricoid cartilage teasing the part and wanting removal. The throat, as far as the eye could reach, was quite normal, and with the laryngoscope I could see that the epiglottis was healthy, but the parts were so intolerant of the mirror that I could not get a good view of the larynx. About a year later, however, it was reported healthy by a skilful observer, who found nothing abnormal, except some undue redness of the posterior nares. The voice was unaffected. She experienced a certain amount of difficulty in swallowing, referred to the cricoid cartilage or a little below, but there was no tenderness. After having improved a good deal she relapsed, and about a year after I first saw her was suffering extreme distress, so that she despaired of recovery, and wished for anything almost to terminate her misery. Her tongue then was really dryish and too red, and the mucous lining of the pharynx in somewhat the same state. She had all kinds of distressing sensations, as dragging of the throat downwards, pains extending to the ears, humming and deafness of the right ear. She was very much worse at night, got no sleep at all in spite of several doses of chlorodyne. She could not breathe freely through the nares, but I could not discover any polypus. When her throat distress ceased she got well immediately, as she had stated once before. I believe that there really was some exudation of blood into the mouth, as she once brought me a handkerchief covered with thin sanguineous expectoration. When I last saw her the throat had been nearly or quite well for almost 3 months. She attributed this amendment to repeated steaming, and I think it very likely that it was highly beneficial. Bromide of Ammonium had previously seemed really useful. However, it should be noted that there were occasional pauses in the disorder, of a very complete kind, followed by relapses, according to the genius of neuroses, so that I do not feel absolutely certain as to the real efficacy of the remedies. It is very clear that the amount of nerve disorder was out of all proportion to the visible change, and there can be no question as to the affinity of the pathema with the neuralgiæ and hyperæsthesiæ. The long continuance of the malady, over 4 years, is quite in accordance with this view.

The excretion of mucus and blood at night seems to me a very probable occurrence. It is not at all infrequent to find instances where hyperæmia of a weak part and exudation are more copious at night. Vaso-motor nerves become more paretic at that time just as others do, and the usual results take place. Iodide of Potassium was pretty fairly tried in this case, as well as quinine and other tonics, but with no notable success. I regret, however, that I did not use mercurials, for there was really some ground to suspect the existence of syphilis, and the disorder might have been "au fond" a syphilitic neurosis. Some neuralgiæ yield to mercurials. Dr. Mackenzie mentions that having occasion to administer calomel with opium for rheumatic ophthalmia to a nobleman long troubled with severe neuralgia of the occipital nerve, which had resisted all sorts of treatment, so long as the mercurial influence continued, the neuralgia was completely relieved (p. 1008).

M. Nélaton relates the case of a man, æt. 35, of vigorous temperament, who came to the hospital under the idea that he had a foreign body in the œsophagus. A fortnight previously while picking his teeth with a thin piece of wood he was suddenly spoken to. His attention was turned away for an instant, and at the moment he was about to make a reply he perceived a perfect sensation of a foreign body on the left side of the pharynx. A practitioner who was at once called in recognised the foreign body at the spot indicated, and made some vain attempts to extract it. Extremely little pain followed, but as this afterwards increased he came to the hospital. M. Nélaton suspected from the narrative that no foreign body existed, and observed that not unfrequently an unpractised finger mistakes the upper edge of the cornu of the hyoid bone for the body supposed to have been swallowed. Usually these nervous symptoms disappear at the end of 3 months under suitable general treatment, but a case was referred to in which they manifested much greater tenacity. A lady about 6 months ago, being about to drink some water sweetened with syrup, not liking the appearance of the latter, placed a single drop on the tip of her tongue, and discovered it to be a solution of potass. Immediately, and though the drop had never been swallowed, she perceived a pain at the lateral part of the pharynx, accompanied by an impossibility of swallowing. The pain diminished, but so difficult did deglutition continue to be, that the patient required an hour to swallow a simple cup of broth, while the passage of the smallest solid body was absolutely impossible. It was believed that she was the subject of stricture of the œsophagus until M. Nélaton being consulted passed down the largest bougies with great facility. ('Brit. Med. Jour.,' June 4th, 1864.) M. Le Gros Clark refers to a similar case.

In connection with throat dysæsthesia I may appropriately refer to *pharyngeal dysphagia* depending on a paretic or hyperæsthetic state of the nerves supplying the walls of the pharynx. Dr. Morell Mackenzie relates the following remarkable instance (v. 'Med. Times and Gaz.,' March 17th, 1866).

Case 3.—In the spring of 1848, about 3 or 4 months after marriage, Mrs. L— began to complain of constant uneasiness in the throat, which felt to her as if it were lined sometimes with stiff muslin, at other times with wet sponge. The sensation for some months was one rather of severe inconvenience than of pain, and no difficulty was experienced in either eating or drinking. She was about this time for 6 months under medical treatment for a tendency of blood to the head. During lactation in 1849 she was seized with an apparent spasm in the throat, followed by such violent choking that the nurse thought she was in a fit. This was while she was drinking some stout. For 14 years from that date she suffered excruciating distress in consequence of inability to swallow any liquids naturally. Most of this time she has been able only to sip drop by drop, and this with great dread, somewhat, in fact, like a patient in hydrophobia. Only once in all this time did she drink naturally, and that was during the pains of parturition when she swallowed a cup of tea. At first Mrs. L— suffered nothing while eating, but after her confinement in 1855 she became so weak in the throat that solid food caused her very great trouble, and from insufficiency of nourishment she wasted to a shadow. She got at length into a most deplorable state of mind and body; she described her throat as closing, and had abandoned all hope of relief, except in the grave, which she longed for. The above particulars are taken from the husband's account. Dr. Mackenzie himself states that the pharyngeal dysæsthesia in this patient was complicated by a slightly impaired action of one side of the epiglottis, and the advance and elevation of the larynx was very slowly performed, probably from loss of power of the elevators of the hyoid bone. Under a course of direct galvanism (faradization?), one pole being applied to the mucous membrane of the pharynx, the other externally, this lady was so restored in 3 or 4 months as to be able to drink with almost as much facility as other people. Her malady had been ascribed by some to nervous delusion, by others to hysteria. Dr. Mackenzie however declares that though of a decidedly nervous temperament this lady was a remarkably sensible and intelligent person, perfectly free from fanciful delusions.

Such a history as the above needs little comment; it exhibits very forcibly the unsoundness of the view that all quasi-hysterical disorders, among which such dysphagia may certainly be reckoned, are owing to defective "morale," and need mental discipline, and not material therapy. This poor lady, with her hyperæsthetic pharynx, was just as really bodily ill as a child who has strumous ophthalmia, or severe chorea, and the actual condition of nerves and muscles was, I believe, very analogous. It is remarkable that drugs as well as change of air were of so little avail. The case says much for the efficacy of electricity judiciously employed.

Dr. L. Türck[1] seems to have noticed this affection, which he designates as neuralgia and hyperæsthesia of the throat. He states that the pain is increased by continued talking or singing, which I should think very probable. The treatment he employs consists in resection of the gustatory nerve and cauterization with solid nitrate of silver.

---

[1] 'Wien. Allg. Med. Zeit.,' vii, ix, 1862.

CHAPTER XXXIII.

SPASMODIC STRICTURE OF THE ŒSOPHAGUS.

This disorder occurs in connection with Rheumatism, so-called Hysteria and Gout. The following case occurred to me many years ago.

Case 1.—A nurse, æt. 38, generally healthy, experienced during 2 days before I saw her a pain across the middle or upper part of sternum, which was increased at the time of swallowing any hard morsel, but not by taking warm liquids. It was worse also on lying down at night. She had sensations of nausea, and as if cold water were lying at the stomach, but no pain during digestion of food. The night of the day following she suffered much from pain evidently rheumatic, affecting the muscles of the back and shoulders, so that inspiration was painful. The next day the œsophageal affection was a little modified, when she swallowed a little bread she felt as if it did not pass down into the stomach, but it did not cause so much pain as before. A day later the pain on swallowing had disappeared, but pain was felt in the region of the stomach, extrication of flatus, however, caused pain in the same place where it had been previously. Hitherto she had taken Potass. Iod. in bark, and some other remedies without much benefit; but now I gave Muriate of Ammonia gr. xv + Vin. Colch. ♏vi in Mist. Ammon. Acet., and with this she was at once relieved in her stomach, and after some more manifestations of muscular rheumatism she got quite well.

The Muriate of Ammonia was given latterly with bark and Cascarilla. The success of this remedy as well as the character of the symptoms leave no doubt, I think, that the œsophageal difficulty was owing to rheumatic irritation of its muscular coat.

The following cases are good illustrations of spasm of the œsophagus of a simple neurotic character. The patients were under the care of Dr. J. W. Ogle.

Case 2.—Robert W—. æt. 66, had been ill more or less for 2 years with occasional tic douloureux, and very frequent attacks of difficulty in swallowing, often lasting for 24 hours at a time. The tongue was furred, the pulse very feeble, but regular. The difficulty in swallowing was confined to solid food. When he first came to the hospital the pain at the right side of the face was intense, but there was no headache. The dysphagia was very painful and troublesome. He was ordered Extr. Belladon. gr. ⅔ *o. n.*, with Infusi Valerian ℥iss + Ferri et Quin. Citrat. gr. v + Spt. Æth. Chlor. ♏xv *bis die*, and a Haust. Senna. At the end of a week he was greatly relieved both as regards pain and power of swallowing, and after continuing his medicines a second week he was discharged comparatively well, only complaining occasionally of very slight inconvenience in swallowing.

Case 3.—A somewhat similar case was that of a female, æt. 34, who was phthisical. She applied at the hospital owing to hoarseness and difficulty in swallowing solid food, which had come on suddenly 3 days previously. A bougie was passed down the œsophagus, and obstruction at a point just below the thyroid cartilage was found. By degrees she recovered, so as to be able to swallow softened solid food. She was ordered Tr. Ferri Muriat. ♏xv + Tr. Quinæ Co. ʒj ex aquâ *bis die.* At the end of 2 weeks a small probang was effectually passed at the obstructed part. Valerian was added to the medicine. At the end of another week solid food was so easily swallowed that the patient took leave as recovered. ('Med. Times and Gaz.,' 1864, Dec. 3rd.)

In both these instances the contraction seems solely referable to nerve disorder, which was manifestly present in the first patient under the form of neuralgia, and may reasonably be assumed in the second on account of the enfeebled general state and the recent catarrhal affection. M. Le Gros Clark relates the very remarkable case of a member of his own household who had dysphagia for 18 years. It was with difficulty she could swallow any food during this entire period, and latterly she lost strength rapidly, as she well might from her almost entire abstinence. A tube of ordinary size was passed without notable difficulty, and the relief was immediate, complete and permanent. There was no trace of hysteria. (v. 'Brit. Med. Journ.,' 1869, Vol. II, p. 231.)

Case 4.—Mr. H. Power ('Lancet,' 1866, Vol. I, p. 253) records a case of spasmodic stricture of the œsophagus in a male æt. 48, who had led a very active country life until about a year before he came under his care in the autumn of 1857. He had at this time great difficulty in swallowing solid food, and still greater in swallowing liquids, owing to their producing a violent explosive cough, and had been accustomed for some time to live on potted meats and puddings. He had pain just above the thyroid cartilage, and on an incision being made about ʒj of well-formed pus was let out. After a few days it was observed that when he drank a glass of wine he let it trickle down the œsophagus and did not perform the movements of deglutition. A bougie could not be passed easily at this time, but a little later on more force being applied it was found that the introduction was not difficult if the muscles of the pharynx were taken by surprise, and the instrument rapidly and cleanly passed, but if there was a momentary delay its introduction became impossible. Saliva and tenacious thick mucus accumulated in the pharynx and caused much distress. Orange juice sipped greatly diminished the secretion of saliva, and relieved the patient from the constant and exhausting efforts to hawk up the mucus. He emaciated and grew weaker rapidly, but his intellect was singularly clear, and his muscular power considerable to the very last. He died 5 or 6 months after he was first seen. At the autopsy Mr. Paget was present, and the result may be summed up in the statement that there was absolutely no disease discoverable in the larynx, pharynx, root of tongue, pneumogastric nerves, nor in any other organ. We were constrained, says Mr. Power, to regard it as a case of spasmodic stricture of the œsophagus.

Whatever may be the explanation of this remarkable case, it shows how severe may be the symptoms attendant on spasmodic stricture, and how similar its results to those of organic. The collecting of thickish mucus in the upper part of the throat has always appeared to me a very ominous symptom of permanent obstruction.

Dr. Brinton, speaking of spasmodic stricture of the œsophagus, observes that "the difficulty is oftenest seated at or near the pharyngeal end of the tube. Here the patient sometimes complains of a sore spot, over which the food 'scrapes' in its sensibly slow and difficult transit. Sometimes there is felt to be a downright stoppage followed by the return of the food into the fauces or mouth. Sometimes this is accompanied by a painful and irregular action of the muscles of deglutition generally." In the middle part of the œsophagus spasmodic stricture seems to be very rare. "It is at the cardiac end of the œsophagus that we get the closest imitation of organic contraction. Dull continuous pain often referred to a deep-seated part below or behind the left nipple, increased to severe suffering by the passage of every mouthful of food, sometimes accompanied by a sense of stoppage, and rarely by the return of the bolus into the mouth—these are symptoms, the mere enumeration of which may sufficiently show that there is some chance of their being interpreted to mean true organic stricture." The distinction turns on regurgitation when it occurs, being almost immediate; the food is flung back by a spasmodic tube, not falteringly passed along a variable segment of a diseased one, or gradually arrested as it nears the stricture to accumulate above its ring. If the bolus stays some 40 or 50 seconds down the tube before it returns the symptom is almost characteristic of organic stricture. Another feature is that the passage of liquids is in occasional instances much more resented than that of solids. This is not the case of course in ulceration or organic stricture.

The history of these cases is also distinctive. They are almost invariably associated with gouty dyspepsia, and attended with great acidity and loading of the urine with uric acid and urates, and often connected with tympanitic distension of the stomach and intestines.

Dr. Brinton believes these spasms to be produced by some irritating matter in the blood, either alone or aided by any decomposing secretions or ingesta which may chance to be present, and to be essentially similar to a cramp of the leg or foot, such as may be produced by indiscretion in diet.

The effect of treatment is decisive. Dr. Brinton has not found any case of spasmodic stricture resist treatment suitable to the above variety of dyspepsia. ('Lancet,' 1866, Vol. I, p. 3.)

LEEDS SCHOOL OF MEDICINE

CHAPTER XXXIV.

LINGUAL HYPERÆSTHESIA.

This is a very severe and intractable variety of nerve disorder, at least in bad cases, far more so than the preceding. I have termed it a neuralgia, and believe that it is such essentially. There is, however, in well-marked instances more or less of morbid alteration of the mucous membrane. The surface appears over-red, insufficiently covered with epithelium, as it were denuded in patches, between which are others of whity coating. The edges are often indented, and there may be some appearance of ulceration, but this is only exceptionally present, and is certainly not of the essence of the disorder. I have often seen scarlatinal and other tongues much more red, denuded, and sore looking, with nothing like the same amount of uneasiness. The distress from the sore or burning sensation is very great, and the patients are apt to have a morose, unhappy look. The disorder is remarkably persistent, in one of my cases it had continued twelve, and in another six years. Of six cases four were females. In the way of treatment iron and quinine, arsenic, ol. morrhuæ, tr. aconite have proved beneficial as internal remedies, and among these I think arsenic holds the highest place. Locally borax with glycerine affords some relief. I must acknowledge, however, that I feel far from confident when entering on the treatment of a case of this kind of achieving any decided success. Milder cases, certainly, are cured, but old standing ones are very obstinate. The cause of this is, I think, partly the high degree in which the organ is endowed with nervous susceptibility, and partly its almost continual exposure to causes of irritation. *Il va sans dire* that the state of which I am speaking is not merely the result of bad and decayed teeth pressing against the organ. The following cases are worth recording :—

Case 1.—M. C—, female, æt. 52, admitted May 26th. Ill one year as at present, worse the last six weeks. The disorder commenced first six years ago. The tongue at its anterior third looks red, denuded, eroded somewhat, with thin white patches on its surface. A sensation of burning rather than soreness is complained of. Pulse of good force. Never had any cutaneous eruption. Lotion of borax and glycerine. Liq. pot. arsenit. ♏iv *ter die.* June 16th.—Is getting better. Tongue much easier. 30th.—Mouth very painful; burning sensations in throat; slight indications of an eruption on the tongue. July 10th.—Pulse full and rather excited; has burning pain in tongue and throat. Tongue has the same appearance as at first. Can't take any food. Quinine gr. vij *ter die.* Ol. morrh. ℥i *ter die.* 24th.—Is a great deal easier, has none of the burning heat now. Tongue more comfortable, but feels parched at night. Takes food better. August 4th.—Doing well. Tongue looks healthier, more covered with epithelium. 18th.—Tongue a great deal better, only a little place at left side, which is sore. Pt. Ferri carb. sacckt, gr. 20 *ter die.* 28th.—Tongue very painful last four days. Pt. She did not attend again; probably the relapse was not of long duration, but it marks well the obstinate character of the disorder.

Sir C. Bell mentions briefly 3 cases in which the patients complained of the sensation of hairs across their tongues. 'Nervous Syst.,' p. 395.

Case 2.—M. S—, female, æt. 30, admitted December 16th, 1861. A large, fine-looking woman, unnaturally flushed in cheeks, at present they are hot. Skin of hands cool, damp. Pulse quick, weak. Is weakly, suckling nine months. Has headache, and loses her sight at times. Has five healthy children, two dead with measles, and one with teething convulsions. She has been ill for twelve years, suffering with her tongue; it feels sore along the edges, which are indented, but not ulcerated. Some weeks later when she was suffering much it was noted that there were small streaks or spots of red elevated papillæ, where the mucous membrane appeared denuded; in the intervals the surface was pale and depressed. The tip was the tenderest part. Teeth pretty sound. Digestion often imperfect. Manner morose. Urine very clear and pale, sp. gr. 1010, deposits only scaly epithelium. Tongue is much better some days than others. The affection has been regarded as syphilitic. She has taken hyd. bichl. and pot. iod. and pot. chloras, without benefit. She never had any cutaneous eruption. Treatment was continued, though not regularly, up to July 28th, 1862. She benefited more by liq. potas. arsen. ♏vij—x *ter die;* but at the time of her taking this she became pregnant, which induced, as it had on several previous occasions, stomach derangement, and aggravated the lingual disease. I saw her again February 6th, 1863, when she had been confined fourteen days. She stated that she had suffered much with her tongue all through her pregnancy, but was relieved soon after. This is the only pregnancy where this has been the case; usually the neuralgia continues a long time after. She is now again under treatment.

Case 3.—J. G—, male, æt. 33, admitted March 19th. Ill two years with tongue affection. Some spots form on one or other margin and under surface, which appear slightly depressed, and partially covered with a whity layer, detached epithelium. These were seen on several occasions during the time he remained under observation (about five months), they never appeared to be more than excoriations. He had had a chancre once, but there was no cicatrix to be seen on the penis. No trace of syphilis. Arsenic with tr. aconite and ferri + quin. citras was of much benefit, so that on one occasion he thought himself quite well. He soon, however, relapsed. At the time when he appeared recovered there were still traces of the whity patches remaining. In this case, more than in any other, there were indications of some quasi-eruptive affection like a vesicular skin disease; but I doubt whether this was more than secondary. I think there was more sensory disorder than the small amount of visible local alteration could account for.

Case 4.—W. W—, male, æt. 50, admitted July 27th. Ill six months. His tongue looks at anterior part of dorsum denuded, and semi-raw, with whity coating here and there, and some tendency to fissure, especially at the tip, the edges indented. He can scarcely eat anything for the soreness, which is relieved by hot water, but cold causes smarting. Never had eruption or sore throat. Had a chancre twelve years ago, and suppurating buboes thirty years ago, no cicatrices in groins or on penis. Pain is always worse at night. About October 1st, when the tongue was feeling quite well, I observed a characteristic arcuate group of syphilitic tubercles encompassing the left commissure of the lips. Subsequently this group spread peripherally. Arsenic, with cod-liver oil, has been of material service to the tongue, so that it is kept pretty easy as long (January 7th, 1864) as he continues the remedy, but on two occasions, when pot. iod. and nitric acid have been substituted, he has immediately relapsed. Painting the eruption on the lips with iodine has lessened it a good deal. January 25th.—The state of the tongue is aggravated, there are in the middle of the dorsum two or three fissure-like depressions with intervening induration; the surface of the cheek is red and sore; he feels very low and languid. The tongue is in more pain at night. Quinine gr. v + liq. pot. arsenit ♏x *ter die*. Pt. c. oleo. He continued this with decided benefit up to February 15th, when I gave him, besides Plummer's pill, gr. v. o. n. March 3rd.—The eruption of the face had improved very much, his tongue looked much better and healthier, and felt to him nearly well; he could eat anything. The mixture was omitted, and the oil and pill continued. 10th.—Still doing well. It is doubtful in my mind whether this was a case of actual syphilitic neuralgia, *i.e.*, depending principally on the poison of syphilis, or whether it was ordinary neuralgia occurring in a syphilitic subject. I rather incline to the latter, inasmuch as pot. iod. was injurious while arsenic was beneficial. The mercurial, however, has certainly done much good.

CASE 5.—E. R—, female, æt. 55, had suffered since the spring of 1858 with more or less of a choking sensation, which at times came on "so fearfully" that she thought she must be choked. She described her state from this sensation as not feeling "ill exactly, but out of spirits and fearful, as I suppose one would feel if a halter were about one's neck." Her tongue was so very sore that it was painful to eat and difficult to talk. She thought that the principal seat of the disorder lay in the tongue, which caused constant efforts to swallow, and that produced the dryness in the throat. Occasionally she was quite free from the distressing dysæsthesia. She took quinine with decided benefit, as well as a generous diet. In the autumn of 1859 she came under my care again in a state of great depression, with a cold, pallid skin, very weak pulse, anorexia, nausea, and very distressing sense of dryness of the mouth, her tongue feeling like a piece of leather. The night was the only time when she was quite free from the distressing sensation. Tongue appeared indented, but not ulcerated. Bark + ammonia was given, and acidi arseniosi gr. $\frac{1}{20}$ *ter die,* and she removed to the seaside. In three weeks she was almost, if not quite, well. In this case there appears to have been a combination of lingual and pharyngeal dysæsthesia. I have considered several times how far the condition of the tongue described above could be regarded as the result of lichenoid eruption, but I have never seen any such state of the tongue in ordinary lichen or prurigo, nor have I seen in lingual neuralgia any such eruption of the cutaneous surface, nor has the appearance of the tongue itself sufficiently warranted the supposition. In one instance, however, an old woman who suffered terribly with this disorder, there was some slight eruption about the edges of the lips, the tongue, however, appeared almost normal, and the neurotic character of the pathema was shown by its being relieved by opium internally, and by its alternating at one time with otalgia. Her suffering was so great that she used to keep constantly a piece of soft rag in her mouth. In severe cases of this disorder Dr. L. Türck's practice of dividing the gustatory nerve might, I think, be adopted.

The following case is of a different kind, but may be properly cited here. It is designated neuralgia of the tongue. A man æt. 30 was suddenly seized with violent pain in the posterior half of the left side of the mouth, about opposite the last molar tooth. From this part the pain extended to the front of the tongue, it prevented him from sleeping at night. Mastication was difficult and painful; the tongue was covered with a yellowish fur; the breath was fœtid; the patient had lost his appetite, and had headache and constipation. The pain afterwards extended downwards towards the submaxillary gland, and the gums became painful. Dr. Neffe recognised the case as one of neuralgia of the lingual nerve, the pain being most intense at the point where the nerve is most superficial.

Emollient and narcotic applications, and laudanum and atropine introduced into the ear, were all without result. Dr. N. then applied faradisation, placing one pole in the meatus of the ear, which was filled with water, and the other on the mastoid process. The pain was at once relieved; it afterwards, however, returned, but with less intensity. A few repetitions of the remedy entirely removed the pain. ('Brit. Med. Journ.,' 1865, Vol. II, p. 418.)

CHAPTER XXXV.

BRACHIAL NEURALGIA.

Romberg gives but a short notice of this form of neuralgia; he considers it less frequent than crural, and less isolated than sciatic and facial neuralgia. Lussana and Bergson have entered fully into the subject in their prize essays, published at Milan, 1859, 1860, and reported fully in Schmidt's 'Jahrb.,' vol. cviii, p. 168, and vol. cxiii, p. 296. Lussana describes at length the various symptoms produced by neuralgia in the several nerves proceeding from the plexus, noticing particularly the terminal painful points, the superficial, and the intermediate painful track (via dolorosa). The superficial painful points are where a nerve is given off from its trunk, where it perforates a muscle, or runs round a cylindrical bone, and where it becomes subcutaneous. In its direction the pain may be centripetal or centrifugal; in the latter case it is continuous and without any elevation of temperature. The pain is, as a rule, increased by pressure, and except in the case of the internal cutaneous nerve by motion. With regard to the temperature of the affected parts Lussana finds it objectively or subjectively increased in neuralgias of cutaneous and sensitive nerves; objectively or subjectively lowered in neuralgias of nerves that are chiefly motor. Whenever the affected nerve is compound, *i. e.* motor as well as sensory, muscular symptoms are observed, which vary much in degree, but may amount to complete paralysis. If the short and long thoracic nerves are affected, the respiration may be short, laborious, and painful. Pyrexia rarely occurs except in plethoric habits, nausea and gastric disorder may be present, or even delirium. The type is generally inter- or sub-intermittent. The diagnosis between Br. Neuralgia and Neuritis is made to turn on the greater rarity of Neuritis, on the more apparent causation of the latter, on the absence of pyrexia in neuralgia, on the more continuous character of the pain in neuritis, on the absence of signs of local inflammation, and of local tenderness on pressure on the affected nerve, on the greater amount of pain in the terminal points in neuralgia, and in the trunk in neuritis, on the greater constancy and earlier appearance of paralysis in neuritis, on the greater severity of the muscular cramps and spasms, and on the different state of the terminal points in chronic cases, they being painful in neuralgia and anæsthetic in neuritis. In Neuroma the pain extends more in a centripetal direction than it does in neuralgia. Lussana notices the existence of neuralgic pains in disease of the heart and great vessels, in disease of the lower part of the cervical region of the spinal cord, and of the vertebral column, in hepatic disease, in constitutional syphilis, and in lead-poisoning which might be mistaken for essential brachial neuralgia.

Bergson arranges brachial neuralgias more according to their causes, as traumatic, rheumatic, sympathetic, hysteric or chlorotic, saturnine, such as depend on spinal irritation, and finally the idiopathic or essential. He rests the diagnosis of neuritis on the almost invariable previous occurrence of an injury, and on the increased size of the painful nerve, which can be detected through the skin. True chronic idiopathic neuralgia he considers to be very rare and very refractory to treatment, while acute is much more tractable.

I have records of seventeen cases in which the nerves of the hand and arm, especially the median and ulnar, were the seat of more or less severe neuralgia. As the affection has not been described so particularly in our own country, it may be worth while to record them shortly. Fifteen of them were females. The oldest patient was sixty-six, the youngest twenty.

Case 1.—M. C—, æt. 25, female; ill three months with pain of right hand affecting all the parts supplied by the median nerve. It is worse at night, destroys sleep. After other treatment continued for a month had failed I gave quinine gr. v *ter die*, and subsequently gr. x *ter die*. Under this she was well in three weeks.

Case 2.—H. O—, female, æt. 54; ill for a long time with a numb and sleepy feeling in her hands at times, aggravated to violent pain at night. Cured in about ten days by small doses of quinine and iron.

Case 3.—C. B—, female, of mid-age; is awoke during night by a numbness or pain in the fingers of both hands, those supplied by the ulnar nerve being first affected. The morbid condition extends to the forearm. During the day the neuralgia ceases. Cured in five or six weeks by moderate doses of quinine + iron. Slight rigors occurred at night as the neuralgia yielded.

Case 4.—M. J—, female, æt. 29, four months pregnant. Ill one month with pain in hand and forearm not extending above elbow, severe at night, but only felt as a numb sensation during the day. There was marked debility. Quinine gr. xv and ʒss in the day failed, and so did arsenic and ferri carb.; quinæ gr. ij + ferri sulph. gr. iv *ter die* was now given with morphia and henbane at night, and cured in three weeks.

Case 5.—E. E—, female, æt. 56, complains of pain in right forearm extending from fingers up to elbow, commencing in mid-finger. It is of more burning character at night, does not disturb her rest, but is very severe in morning when she cannot move her hand to open or close it. The fingers often feel burning when she touches or holds anything, at other times are numb. Foot somewhat similarly affected, Small doses of quinine + iron, larger doses of quinine, carbonate of iron, muriate of ammonia, and cod-liver oil, failed to do more than to give some temporary relief. Under strychniæ gr. $\frac{1}{12}$ *ter die* and extr. col. co. gr. v. o. n., with the continued use of ferri carb., she improved considerably, so that she was able to do needlework, whereas she had at first been unable to hold a needle. She continued this treatment five or six weeks, having had, for the last fourteen days, pot. iod. gr. ij *ter die* in addition, and was then well enough to be discharged. One galvanisation appeared to be beneficial, a second rather injurious.

Case 6.—J. M—, female, æt. 48, suffers with bleeding hæmorrhoids. Ill three months with pain in centre of right palm extending up the arm, over the shoulder, to the spine; it is constant and gets worse, is increased at night. Hand is numb except the fingers and thumb, there is much burning sensation in it. No sleep at night. Cured in a month by small doses of quinine + iron, and morphia at night. It was remarkable in this instance how the pain extended itself upwards like an aura, not in the track of a nerve, and how the fingers were exempted from the disorder. The affection was evidently peripheral.

Case 7.—E. M—, female, æt. 47; ill three weeks with pain chiefly of right mid-finger, in daytime it is numb. Left hand slightly affected. Urine very thick. Pot. iod., liq. pot. arsen. and liq. pot. for a week were of no avail, quinine in gr. xv and xx dose daily was more beneficial, but recovery took place under quinine + iron + liq. opii sed. in small doses, with henbane at night. Some pruritus pudendi occurred during the last few weeks of treatment, and was much benefited by a borax and opium lotion.

Case 8.—J. T—, female, æt. 66. Ill more than six months. Is quite well except in her arms, which get stiff and numb, and ache, and are very cold. She suffers thus most at night. She took ferrocitrate of quinine gr. x + tr. nucis vomicæ ♏x + aq. ℥j *ter die*, and used locally lin. camph. co. In six weeks she was nearly well.

Case 9.—S. K—, female, æt. 40. Ill more than a year. Has pains in hands, extending up arms to shoulders, giddiness, and general weakness. Most pain in right arm, Pain shifts from hands occasionally to the left side. With pot. iod. + citrate of iron and quinine she recovered in about three months.

Case 10.—E. L—, female, æt. 46. Ill fourteen days. Catamenia ceased three years. Some rheumatic symptoms lately. She took at first pot. iod. with alkali and colchicum, with benefit for a week, her head being relieved; but she complained of her hands being attacked with numbness and cramp in the morning about 5 a.m., which continued in fits of ten minutes' duration off and on till noon. A week later the pain came on earlier in the middle of the night, and was severe. With quinine and iron in moderate doses she improved, but did not recover. Probably rest and good food were essential as affording a basis for medical treatment. In this respect the disadvantages of external hospital patients can hardly be exaggerated. Success with them is a real test of the efficacy of drugs.

Case 11.—R. B—, male, æt. 65. Ill three or four days. Stout, healthy looking. Has lost the use of right hand, can hardly grasp at all with it or use a knife or pen. The parts supplied by the median nerve are numb, but never in pain. Feels some stiffness up to the elbow. The affection came on suddenly. No pain in head, no giddiness. Not subject to rheumatism. Skin warm. Glands in axilla not enlarged. He took for a week hydr. bichl. gr. $\frac{1}{8}$ + pot. nitrat. gr. x + inf. gent. co. ℥j *ter die*, with slight benefit. Afterwards he had citrate of iron and quinine gr. 8 *ter die*, and was well in a month.

Case 12.—C. G—, male, æt. 20. Ill one week with pain in left arm, from elbow to tips of fingers, worse at night, relieved by heat. With gr. xij of quinine daily he was quickly well.

Case 13.—C. R—, female, æt. 40. Ill three weeks with pains in arms and hands, after any much exertion her fingers get quite straightened so that she cannot bend them at all, she then feels "awful" pains in fingers extending up to shoulders. The pain is a great deal worse at night, is a sort of tingling and numbing pain. Can hardly dress herself in the morning. Left arm but little affected. Skin warm. Urine pale. Pulse not weak. Small doses of quinine + iron and pot. iod. were of no avail; she complained eleven days after admission that if she had any hard work during the day her hand at night got quite stiff, and was in unbearable pain after she had slept about two hours; while if she had a quiet day she suffered only numbing and tingling sensations at night. The fingers got numb if she tried to write or sew. She suffered in exactly the same way eleven or twelve years ago. She was considerably improved by full doses of quinine, gr. 20—30 in the day. An interlude of dyspepsia then occurred, after the relief of which she took ferri carb. gr. 20 *ter die*, and was nearly well at her last visit. The effect of exertion in aggravating the disorder was very apparent in this case.

Case 14.—A. R—, female. æt. 43. Ill seven days, was attacked in sleep all of a sudden, pain came on in the left shoulder, ran down the arm, and settled in the hand, which feels very powerless; the two inner fingers are much more numb than the others, but all are much affected. The pain in the hand keeps her awake at night, being worse then, it shoots down from the elbow. Hand sometimes very cold, at others hot; when hot the pain is increased. Urine clear. Aspect pallid. Pulse weak. The pain quite ceased under full doses of quinine, gr. xl—l a day, with ol. morrh., and the numbness also diminished, but the hand remained almost completely paralysed, with scarcely the least movement of flexion or extension. The quinine alone seemed only to weaken her memory and sight a little; when ferri sulph. was added, she became nearly blind and deaf. After this she was ordered strychniæ gr. $\frac{1}{20}$—$\frac{1}{16}$, with tr. cinch., under which she regained some motor power, but in spite of galvanising both with the interrupted and continuous current (she wore Pulvermacher's chain for some time) and a month in the country there was still very little power over the hand when I last saw her after three months' treatment.

Case 15.—A. L—, female, æt. 47, ill at first for six weeks with sore throat and debility, got much better. At the end of three months began to complain of agonising pain extending from shoulder to wrist, and to the finger ends, continuing day and night, destroying all rest, and extending up the side of neck. No difference in appearance or temperature of affected parts. Pulse of good force, rather frequent. Of large make. Feels very weak, but otherwise well. Quinine in daily dose of gr. 20 to 28 failed to benefit, as well as extr. belladon. gr. ½ 2*dis horis,* and liq. pot. arsen. ♏v *ter die.* Pot. iod. gr. v—vij *ter die,* with two opiate subcutaneous injections was of some service, but most benefit was obtained by the local application of tr. aconite undiluted, with arsenic internally, under the use of which the arm became quite well. Just after this, the aconite having been continued about one month, and the arsenic five weeks, an eruption appeared on the upper arm attended with fearful itching and much heat and redness. The aconite was replaced by a strong lead lotion, and the arsenic continued. Three days later erysipelas had markedly developed itself over most of the arm and shoulder, attended with swelling and papular eruption, and pinching and burning pain in the part. She felt shivery. Pulse excited and feeble. Bark and ammonia was ordered, and the arsenic omitted. In four days all the redness had subsided, the swelling continued with much pain about the arm of scalding character. Much thirst. In ten to fourteen days she was well. In this case aconite and arsenic appeared to be the most effectual remedies. I can scarcely think the aconite had anything to do with producing the erysipelatoid inflammation, as it had been used fully three weeks without any such result. I have, however, known aconite to cause cutaneous irritation. If this cause be put aside I see no other view to take than that, as the cerebro-spinal nerve-disorder yielded, the vaso-motor nerves became implicated, and this in the way of paralysis. There does not seem in this case to have been any musculo-motor nerve paralysis, which was so marked in No. 14. In a case I saw only once the patient, a female, æt. 45, suffered with nocturnal burning, throbbing, and painful sensation in hands and arms extending up to the shoulders with numbness of the fingers. The urine was clear, she had no indigestion.

Case 16.—E. G—, female, æt. 26; ill two months ago with scarlet fever, on making any exertion experiences a pain in chest, and loses sensation and power in left arm. Pulse 96, weak. She took strychnia and iron and was nearly well in fourteen days.

Case 17.—S. H—, female, æt. 34, admitted May 19th, ill five weeks. Her right hand "goes dead" three or four times a day, it is constantly weak so that she cannot hold things with it, and she has constant pain and tenderness at the styloid process of the radius; no swelling of the wrist. Tongue whity and indented. Bowels costive. Urine rather dark. Has lumbar pain. Is weak and languid. She was not benefited by small doses of quinine and pot. iod., became worse with exceeding pain about the wrist and up the arm; a blister has caused much irritation. The hand was so cold one night (May 28th) that she was obliged to put it for relief into hot water. There was some diarrhœa and nausea, and she felt extremely depressed and languid. The quinine was increased to ℈j in the day and the bowels quieted with opium and chloric ether. June 2nd.—A great deal better, the other fingers are comfortable, but she has much pain in the index and thumb. While the blister was open she was free from pain in the styloid process, now it has returned to that part, and to the adjacent articulation of the thumb. The quinine was increased to gr. viij *ter die,* and by the end of June she was convalescent and went to the country.

The above histories are sufficient to prove that brachial neuralgia is not, at least in this country, a very rare affection; for several years I used to meet with it quite as frequently as sciatica. The two seem to be essentially similar in their nature, relation to rheumatism, causes, and treatment. A rheumatic element appears, however, to be much less frequent in brachial than in sciatic neuralgia, and in correspondence with this pot. iod. and arsenic are found to be less efficacious. The influence of debility in predisposing to and maintaining the disorder is very decided. Besides this, however, we must assume some special agent to be affecting the nervous system injuriously. What that is cannot be precisely stated, but it seems to me that we shall not err greatly if we suppose some general miasmatous influence, widely dispersed, and varying much in its potency at different periods to be the efficient motor of the phenomena. There seems to be some sound reason for believing that neuralgic and epidemic catarrhal (influenzal) disorders are rather closely correlated in their origin, the cause of the latter giving rise also to the former. Mr. Norris, of Petherton, and Mr. Ewens, of Blandford, have recently stated[1] their experience as to the occurrence of sequelæ of hemicrania, and intermittent cephalalgia in connection with influenza. Sir H. Holland's experience is to the same effect. Hjaltelin[2] says that influenza in Iceland was followed by various neuralgic pains, especially lumbago, otalgia, odontalgia, facial and intercostal neuralgia and hemicrania. Similar observations have been made long ago as already stated by others. Herpes Zoster when affecting the arm may give rise to very marked neuralgia attended with paralysis, as in an interesting case recorded by Dr. Broadbent (v. 'Brit. Med. Journ.,' 1866, Vol. II, p. 460). In this it seemed as if the pain and the palsy were not confined to the district of one particular nerve, but ranged over several. Several points of the above histories illustrate the neuralgic habitudes of the disorder. The nocturnal aggravation of the pain; its remission or absence by day; the intimate relation between it and numbness so that the latter seems to be a less degree of the same condition; the co-existence in some instances of motor disorder; the prevalence of general debility; the absence of self-limitation are family features of neuralgia. The results of the treatment above detailed seem to me to show pretty conclusively that the malady was not depending on any remote cause of irritation, as decayed teeth, worms, intestinal accumulations, &c.; nor on gouty poison or dyspepsia. These, however, are very possible causes, and we should be prepared to meet with them, as the following case illustrates.

Case 18.—C. —, æt. 43, a fine-looking, active man, who stated that he was very healthy, consulted me respecting a most violent neuralgia of the right arm, which had attacked him 6 weeks before, and continued severely for nearly 14 days, since which time it had gradually subsided. It commenced above the clavicle and extended down along the outer side of the arm; the pain was most agonising, but was relieved temporarily by sinapisms and turpentine; it caused great perspiration. His health was not otherwise disordered. The exciting causes seem to have been a mental shock, and exposure of the arm to a chill. The urine had been clear most of the time he had been suffering. When I saw him he had some numbness in the right thumb and index finger, and could not flex the latter fully. He resided in an aguish locality, but had never suffered. I advised ♏4 of Liq. Potass. Arsen. *ter die*. About 13 months later I saw him again, when I learned that he had had no bad attack, but was scarcely ever free from uneasiness in the site of the old pain. He marked out a spot near the anterior edge of the deltoid insertion, another a little below the external condyle of the elbow, and a third a little above the wrist, along the edge of the radius, as special seats of pain. During aggravations the pain was felt in the index finger, not in the thumb. It interfered occasionally with his writing. It was induced by any increase of damp or moisture in the air, and by anything that generated acid in his system, as a glass of port wine. He could, however, take a pint of claret with his dinner very well. His country-house was near the seaside, and he found sometimes the neuralgia quite disappear when he quitted of an afternoon his place of business, and went into the purer air. There was some decided tenderness at times along the painful track of the nerve. His general health and strength were very good. I advised blistering along the painful track, with subsequent application of morphia, or painting with Tr. Iodinii + Morphia, and Hypophosphite of Soda gr. x *ter die*. The following year he came to tell me how he had got complete mastery over his old enemy by the use of Potass. Bicarb., of which he took ʒss or ʒj occasionally.

---

[1] 'Med. Times and Gaz.,' April 11th, 1853.

[2] 'Edin. Med. Journ.,' Feb. 1863.

This case is quite analogous to Dr. Rigby's of facial neuralgia. Such patients are probably always in better condition than those who suffer with malarious neuralgia, or such as is based on nerve debility. In doubtful cases it will be well to premise a few doses of alkali before administering quinine or arsenic.

The following is a somewhat similar instance.

Case 19.—A medical friend, æt. 56 (?), knocked up with hard work, not objectively ill, was suffering with attacks several times a day of intense pain affecting both arms from wrists up to shoulders. It was very severe and distressing, did not follow the track of any particular nerve, but seemed generally diffused through the limbs. He thought it somewhat resembled gouty pain. His stomach was weak and irritable, and the pain was more inclined to come on sometime after food. He had been taking his meals very irregularly of late, and hurriedly. I advised Extr. Cannab. Indic. gr. ½ + Morph. Mur. gr. ⅛ in pil. *quater die*, and Tr. Cinchon. flav. ʒj *ter die*. I heard two days later that after the third pill he had no return of pain, only experienced weakness and exhaustion.

The influence of heart-disease in producing a certain form of brachial neuralgia should also be remembered. The cases illustrate sufficiently the treatment which should be pursued. One main point is to improve the general tone and strength. If this be effectually accomplished there will not generally be much more required. Good air and food, and the usual tonics with occasionally a nightly sedative, are the most reliable means. In some instances ammonia, valerian, and arnica, with nitrate of silver, prove more beneficial than quinine. In local applications I have not much faith, but they may sometimes as in No. 15 afford much benefit. The interrupted current will I think chiefly be found useful where there is motor paralysis; I am sure that it should be used cautiously to weak and hyperæsthetic nerves lest it aggravate rather than relieve the pain. Becquerel,[1] however, maintains that an induced current passed through a nerve in its long axis will always cure neuralgia if the stream is sufficiently strong, and the intermissions are very rapid. I confess I should not like to be the patient so treated. With regard to the continuous current in states of notable impairment of the health, I fear it would be of little real avail unless the morbid tendency of the general system were amended by tonic treatment, but as an accessory remedy I am disposed to think very favorably of it. Dr. Radcliffe has recently praised the use of the hypophosphites in neuralgia together with cod-liver oil and fatty food, viewing the disease from a chemical stand-point. I have not found any special advantage from the hypophosphite of iron and quinine in a few instances of various disorders in which I have tried it, and I certainly should not be disposed to rely on the acid alone to the exclusion of the two bases whose efficacy is so well proved. As an occasional sedative I am as much disposed to rely on chlorodyne as on anything else. A patient of mine told me she had cured herself with this of a sciatica which had proved refractory to orthodox medical measures. I should never use willingly any preparation whose composition was kept secret, but there is not much mystery about chlorodyne. The following history seems properly to find its place here, as it refers certainly to a peripheral neurosis, and not to a cerebral affection. The disorder was probably of the same nature as neuralgia, but inasmuch as it was located in a mainly muscular nerve, it produced rather paralysis than pain. There was, however, very marked loss of sensation, which is often as much a part of neuralgic disorder as pain.

Case 20.—G. W—, æt. 40, admitted November 11th, ill fourteen days, has lost the use of his right arm so that he cannot raise it from the shoulder-joint and abduct it by the action of the deltoid; he can move the forearm, but not so well as the other. Has had great pain about the insertion of the deltoid, which came on in the course of the night, and has been replaced by numbness. The anæsthesia does not extend quite to the elbow. Is not subject to rheumatism. Functions generally in good order. Does not feel weak. Works in a damp place in a brewery. December 20th.—Right deltoid much wasted, unexcitable by galvanic current, skin covering it also very numb; the adjacent muscles and integument are quite lively and sensitive. Whichever pole is applied to the highest part of the arm while the current (interrupted) is passing he feels the shock there not in the lower. But if I place the poles opposite each other, on either side of the deltoid, he feels the shocks in both. He finds the arm stiffest in cold weather, and he suffers more pain then in it. The chief pain is a little below the seat of numbness. January 7th.—Deltoid much wasted, remains insensible to the strongest current, which has been used almost daily. On one occasion the current was sent directly through the muscle by needles passed through the skin. No good effect ensued, but he was unable to bear nearly so strong a current as before. It is very observable that the cold air produces "gooseflesh" all over both upper arms and shoulders when he is stripped, except over the paralysed deltoid. Some weeks later the interrupted current had precisely the same effect, the anæsthetic skin remaining quite smooth, while the sensitive contracted. February 4th.—I have passed a continuous current from a 6-cell battery through needles stuck into the muscle, no muscular motion nor any sensation was produced while the current was passing, but on interrupting it the muscle contracted. The deltoid has shrunk and wasted much since I last saw him. He was now directed to wear a small Pulvermacher's chain on the affected part. In three weeks there was no improvement, the deltoid and infra spinatus muscles were quite irresponsive to faradization, the skin over them still numb. March 12th.—Slight improvement. April 16th.—Is recovering more use of arm and the numbness diminishes. By about the middle of September, up to within a month of which time he wore the chain, he had quite recovered, save a little numbness in the skin over the insertion of the deltoid. Medicine had a fair trial in this case and appeared ineffectual. Pot. iod. in gr. v doses *ter die*, pil. hydr. c̄. opio to salivation, sulphuret of potassium baths, strychnia carried up to gr. $\frac{1}{4}$ *ter die*, and ammon. murias failed to produce decided amelioration.

---

[1] 'L'Union Méd.,' Nos. i and iv, 1861.

The strychnia was certainly continued at the rate of gr. $\frac{1}{12}$ *ter die* during a great part of the time during which he was wearing the chain, but as it had been fairly tried before without benefit I think it cannot lay claim to the improvement, which was due either to the continuous current or to the *vis med. naturæ*. The chain is no favourite with me, it is a troublesome and rather painful remedy, but I think there is much ground for regarding it as the really effectual agent in this case. Paralyses such as the one above described are much more apt to remain as chronic and incurable affections than to disappear of themselves. The pathology of the above case is obscure, the most probable view is that the disorder was essentially similar to neuralgia of sensory nerves, but it remains unexplained why it was so refractory to treatment. It yields, however, in this respect to Case 14, which was not benefited by the chain, but which in most respects quite corresponds to the picture of neuralgia. It is quite possible and probable that in certain cases the molecular change which conditionates neuralgia may pass on to larger and more complete alteration, even to organic lesion.

LEEDS SCHOOL OF MEDICINE

LEEDS SCHOOL OF MEDICINE

CHAPTER XXXVI.

SCIATICA.

My experience of this malady leads me to regard it as for the most part essentially a neuralgic affection quite similar to neuralgia in any other situation. The proportion of males to females in my cases is considerable, 11 : 6, a circumstance which, if not accidental, may be explained by the greater exposure of the male sex to chills, &c. The impairment of motor power, which often occurs, has been well noticed by Romberg, and is certainly almost as noteworthy a feature as the pain. It shows that the morbid action is not confined to the sensory nerves, but affects the motor in juxtaposition with them. Of the nature of this morbid action we can say little more than that it appears to be identical with that which produces neuralgia in other situations, that except perhaps in recent rheumatic cases it is not inflammatory, and especially that it has usually a positive relation to debility, and will not yield permanently until at least some degree of strength and vigour is restored. It shows itself sometimes in the form of convulsive contraction. Dr. Anstie "in several cases of inveterate sciatica has seen violent spasmodic flexures of the leg upon the thigh." Occasionally severe cramps occur. Dr. Radcliffe's suggestion that, owing to impaired nutrition, some breach occurs in the oleaginous investment (white substance of Schwann) of the axis cylinder is, I think, probable, and at any rate may serve provisionally as a representation to our minds of the state of the parts concerned.

Romberg admits the occurrence of a spontaneous cure in connection with critical symptoms, as diarrhœa, menstrual, lochial, or hæmorrhoidal discharges. I do not wish to question the possibility of this; but according to my own experience the continuance of any discharges of this kind is much more likely to perpetuate than to cure a sciatica. Neuralgic disorder is occasionally met with which affects more the superficial nerves of the lower limb than the deep-seated sciatic trunk. It is essentially similar to the more common affection. The *diagnosis* of sciatica does not generally present any material difficulty. Pain extending down the posterior aspect of the limb in the course of the nerve, especially felt, and increased by pressure between the ischiatic tuberosity and the great trochanter, but not aggravated materially by the movements of the joint, or by pressure of the articular surfaces together, can scarcely be due to other cause than sciatica.

The most important point in refractory cases, especially occurring in the female sex, is to determine whether or not the pain is dependent on any intra-pelvic or other organic disease. Churchill mentions a case ('Dis. of Women,' p. 253) where an ulcerated uterine cancer produced no pain, except in the whole course of the sciatic nerve. Dr. Leishman relates an instance where the cervix was enlarged and somewhat congested, with a glairy discharge exuding from the os. The sciatica, which had lasted 8 or 9 weeks, was distinctly cured by leeching the cervix twice. In such cases there will, however, almost always be other symptoms, such as discharge, or hæmorrhage, which will indicate the true nature of the disease. It is most probable that the pain from cancer uteri is of reflex character, and not occasioned by direct irritation of the nerve. This I conclude partly because the uterus is too remote from the sciatic nerve, and partly because fibrous and ovarian growths which are more likely to press on the nerve do not have the same effect. Very intense sciatica may be dependent upon *hæmorrhoids,* and cease when they are removed. This occurred in a lady under Mr. H. Lee's care. Mr. Ashton has made the same observation. Trousseau[1] declares that sciatica is often dependent on disease of the vertebral column, kidneys, testes, uterus, and rectum, and states that Chomel went so far as to disbelieve in the existence of essential sciatica. He mentions a case where it occurred in a young female after delivery in consequence of a slow inflammation of the sacro-iliac symphysis ending in abscess. The condition here was probably one of neuritis. Though I have the highest respect for Trousseau's opinion, I must say that my experience does not confirm his and Chomel's view as to the frequency of the remote origin of sciatica.

In some instances Sciatica is attributable to *venereal taint.* Dr. Fuller gives a case where a healthy-looking man who denied syphilis suffered with this neuralgia, and did not obtain relief until pains in his shin bones having falsified his denial and justified his physician's suspicions, he was treated with Pot. Iod. in full doses, when he soon got well. Lancereaux alludes to 3 cases which had long resisted all treatment, and which yielded as if by enchantment, when the existence of syphilis, being suspected, mercury and iodides were prescribed. These, however, he would probably regard as cases of syphilitic neuritis of the sciatic nerve (Vol. II, 'Syd. Soc.,' p. 100).

---

[1] 'Clinique Européenne,' No. iii, 1859.

Gonorrhœa may act in a like way. Fournier describes gonorrhœal sciatica as commencing usually quite suddenly, at once reaching the maximum of intensity, after which the pains which were at first excessive became more tolerable, so that by the 3rd to 5th day relative ease is established. The disorder, besides being of much less duration than ordinary sciatica, differs in that it is cured with great rapidity by cupping.

Gout is another recognised cause, and may probably act either by deranging the nutrition of the nerve-tubules with unhealthy blood, or, as Dr. Garrod thinks, by setting up gouty inflammation of the nerve-sheath.

The disease in some cases has a rheumatic character, the urine being lateritious and acid, a certain amount of pyrexia being present, and the strength not much impaired. Here potass. iod. and vin. colch. with alkali are curative, but the iodide should be given in pretty large doses, gr. vij—x, *ter die*. In the majority of instances, however, there is more or less marked debility, the urine is free and pale, the tongue clean, and tonics are evidently indicated. Among these I am inclined to rate arsenic rather highly, as it has served me well in cases which would scarcely I think have recovered without. I am rather partial to the simple solution in distilled water, which easily dissolves gr. $\frac{1}{10}$ per ℥j. As a means of improving the general nutrition, as well as that of the affected nerve, it will be well to administer ol. morrh. in all cases bearing the stamp of debility. I am aware that some physicians have found repeated small doses of croton oil of great efficacy, but it has not occurred to me to meet with such. The remedy should, however, be borne in mind in dealing with refractory disease of this kind. I say of this kind, for it is by no means useful only in sciatica, but also in other neuralgias. This goes far to disprove the view of the mechanical causation of sciatica, viz. that it is produced by the pressure of scybalous masses in the lower bowel. This may occasionally be the case, but certainly it is not common, and on the other hand constipation very often produces no sciatica. I remember an old man in whom, by reason of a large epithelial cancer of the lower rectum, the fæces concreted above into masses about as large and almost as hard as a walnut, which enemata would bring away;—yet he had no sciatica. I am rather inclined to look upon croton oil as acting in certain cases as a specific stimulant to the nervous system. Cases no doubt occur where local bloodletting is necessary, but I can scarcely believe that venesection can be requisite as Romberg states. If this is ever the case it must be when there exists considerable pyrexial disturbance of a sthenic character, and this might be always allayed, I should think, by other means. Ol. terebinth. has maintained for some considerable time its reputation as a remedy for sciatica. I have used it but little, chiefly because the state of the general system has seemed to require more decided tonics. I consider it most appropriate to those conditions where there is no marked debility, or indication of recent rheumatism, or of organic disease. As an outside application, if the pain be severe and the limb intolerant of pressure, I think aconite lotion is the best. If the pain be more gnawing and wearying, and tenderness be not marked, chloroform and opium liniment is preferable. Veratria ointment and belladonna are appropriate to cases where the tenderness is less than in those requiring aconite. Subcutaneous injection of opium or atropine is a very valuable remedy, and may alone suffice to cure. In most instances, however, its effect is temporary, and has to be seconded by internal remedies. What Trousseau says, however, is quite true, that this means must be persevered in some time before we obtain all the results that it is capable of affording. The preparation which I prefer is Battley's Liq. Opii Sed. in ♏x doses, but Morphiæ Acet. gr. $\frac{1}{6}$—$\frac{1}{2}$ is more usually employed. The more severe the pain the more decidedly is the injection indicated. A very feeble pulse would, however, make me hesitate, or at any rate premise a good stimulant. I entirely agree with Dr. Anstie in his advice that not more than gr. $\frac{1}{6}$ of morphia salt should be employed at first. I once produced very marked opium poisoning in a weakly female with gr. $\frac{1}{4}$. Trousseau, however, seems to think differently. He says, which is quite true, that atropia may be used beneficially in much larger doses by subcutaneous injection than when it is given by the mouth. Contrary to his expectation he found to his great surprise that gr. $\frac{1}{12}$, or even gr. $\frac{1}{6}$, of atropia were tolerated quite as well as gr. $\frac{1}{60}$ or gr. $\frac{1}{30}$ administered in the ordinary way. My experience is very similar. I commonly inject gr. $\frac{1}{40}$ in cases of acute rheumatism, but I should not prescribe more than gr. $\frac{1}{120}$ *ter die* for stomach absorption. The like, however, certainly does not hold good in the case of morphia as the French physician implies. Passing over morphia dressed blisters, which may be extemporised with strong liquor ammoniæ saturating cotton wool stuffed into a thimble, or any small holder, we come to notice a procedure which Trousseau was evidently partial to, and which he says combines the action of an issue and of a calmative. Raising up a transverse fold of integument just over the point where the sciatic nerve emerges, he passes a straight bistoury through its base and cuts upward, the patient lying on his face. Nothing more is done that day except plugging the wound, with charpie, and occasionally it happens that this little operation effects a cure. The following days pills are placed in the wound made so as to contain each nearly gr. ij of extract of opium, and as much extract of belladonna or stramonium made up with guaiacum and gum. An ordinary dry issue pea is also inserted to ensure the wound being kept open. The number of medicated peas employed at once may be 2 or 3, and sometimes a smaller number may be applied a second time in the 24 hours. This medication is to be kept up as long as the pain lasts, and for at least 8 or 10 days afterwards, though with diminished doses, and when they are discontinued the issue is still kept open for a time with ordinary peas. This method Trousseau affirms has succeeded better in his hands than any other. Some physicians have much confidence in "firing," I do not mean using the actual cautery, but iron heated by being dipped in boiling water. Dr. Graves indeed states that in very obstinate cases the actual cautery applied to five or six spots along the course of the painful nerve is the means most to be relied on. I should consider this, however, quite a "dernier ressort," and certainly not to be employed unless I was well satisfied of the absence of organic disease as well as of general debility. It cannot be too clearly kept in mind that as long as the latter continues no real improvement can be effected. Dr. Fuller speaks highly of acupuncturation, and there is no doubt of its frequent efficacy in this and other neuralgic affections, although I am not convinced that its virtue depends on the evacuation of effused fluid. Dr. Althaus has found faradization of the affected nerve effectual in sciatica. I can quite believe that this is the case, but it is requisite in using the interrupted current to take care, (1) that the condition is not one of inflammation, and (2) that the strength of the current is not too considerable. I am satisfied that the pain may be aggravated if this caution is disregarded. Torri[1] relates ten cases of sciatica cured by weak continuous currents kept up uninterruptedly for two days. The positive pole was applied to the leg, the negative to the thigh, the epidermis having been previously removed at each spot, and a sponge moistened with saline solution placed in contact with the cutis. The pain of this proceeding we can aver must have been severe, and we are not surprised to read that the skin in contact with the zinc always became gangrenous and required some time to heal. The pain may have been lessened by the half grain of morphia which was placed upon the denuded cutis. A case is recorded by Hooker[2] in which division of the popliteal nerve was successfully resorted to for severe neuralgia of the leg. Jobert de Lamballe[3] has also divided the sciatic (and crural) nerves in a case of great severity, but though much relief was afforded the patient died from sloughing of the skin over the sacrum and pyæmia. He renounces this operation in favour of the actual cautery. In the case of a lady who, after an attack of zona in the course of the sciatic nerve, suffered intolerable pain unrelieved by milder measures, Nélaton divided the sciatic nerve and removed a piece an inch long, but the pain was not relieved although sensory and motor power was lost. Finco[4] reports that he has treated 48 cases of sciatica by cauterizing the *ear*. In 30 the operation was quite successful, in 10 partially so, in 8 it failed. The failure is ascribed by Finco to the presence of various complications. In almost all his cases vigorous antiphlogistic treatment was employed before the cauterization, and in some its effect was aided by mercurial or belladonna ointment. The operation had to be repeated only in 3 cases. Duchenne[5] rejects the use of the cautery, but thinks that the interrupted current may be employed in its stead. He prefers, however, to act *loco dolenti*, using dry conductors.

CRURAL NEURALGIA.

My experience accords with Romberg's that this is a much rarer affection than sciatica, but that in essential points it closely resembles it. Direct irritation of the nerve from a loaded intestine or some similar cause may give rise to it, but less frequently, I think, than the obscure influences which so commonly produce nerve disorder. The possibility of neuralgia and impaired motor power of the thigh being dependent on the existence of obturator hernia should be borne in mind, and if any symptoms of intestinal obstruction are observed an operation should be at once performed. The following case is an example of non-organic crural neuralgia.

---

[1] 'Gazz. Med. Ital. Toscan.' 1857, Nos. xlii, xliii.

[2] 'Lancet,' October 1st, 1859.

[3] 'L'Union Méd.' No. lxxvii, 1859.

[4] 'Gaz. Lombard.,' xxxviii, xxxix, xli, 1860.

[5] 'Tr. de Therapeut.,' par Trousseau et Pidoux, vol. i, p. 787, 788.

Case 1.—Mrs. F—, æt. 65, seen June 14th. A frequent sufferer from neuralgia affecting various parts. Was attacked yesterday, in afternoon, with intense pain affecting both lower limbs from the hips to the ancles and heels. The pain was diffused over the front and exterior of the limbs, and was attended with a sense of powerlessness. She kept rubbing the parts constantly in hope of relief. Functions in order. The pain continued severely from 5 p.m. to 1 a.m., remitted then somewhat, but returned again at 6 a.m. severely for a short time. Up to noon of 14th she had no sleep in spite of ♏ 120 of liq. morph. bimecon. given since the previous evening. A liniment of chloroform, belladonna, and opium gave no relief. Quinine given to moderate cinchonism subdued the pain; on 15th she was quite free. Some slight nocturnal fever occurred as the neuralgia yielded. For some weeks before her attack her nervous system had been much deranged in consequence, as she thought, of a thunderstorm.

In another case a delicate boy, æt. 9, had agonizing pain in his feet occurring in paroxysms succeeded by copious perspirations. Pot. iod. + pot. bicarb. was of no benefit, but with citrate of iron and quinine he soon got well.

The following histories may serve as illustrations of some of the points referred to.

Case 2.—D. G—, æt. 60, a hale, strong-looking man, was admitted November 2nd, 1866. He stated that he had generally enjoyed good health, and his calm and steady manner inspired confidence that his complaints would not be exaggerated. Three weeks ago, while at work, he was taken instantaneously with severe pain in the right hip, and down the leg to the ancle; he turned faint, sick, and giddy, every nerve trembled. He did not 'rick' or strain himself at all. After half-an-hour he recovered a little, and was taken home to bed. When attacked he did not fall, nor lose consciousness, but was obliged to lie down. His urine at this time was not thick or red. Since his illness he has had difficulty in urining; he is ten minutes in passing a quantity which, when well, he would have passed in one. At present the pain persists and is continual, is rather worse at night. Heat makes the pain much worse; if he was to put the limb near the fire it would drive him into fits. The movements of the hip-joint are quite free. Has not the least power of moving the limb as he lies in bed, can barely stir the toes a very little. The limb is somewhat wasted. Bowels not at all costive. The next day I found, on faradizing the limb, that the muscles on the anterior aspect of the thigh, and on the anterior and posterior aspects of the leg, acted tolerably well, those on the posterior aspect of the thigh were more inert. The appetite was good. Urine acid, not albuminous, sp. gr. 1015. By the 22nd he was able to walk about the ward for 3½ hours before he felt tired; he had not the least pain in the limb, only a little trifling sense of weakness just behind the great trochanter. He passed his urine quite freely. The treatment employed consisted of subcutaneous injection of Liq. Opii Sed. ♏x, which was repeated nightly 6 or 7 times, faradization, oleum Morrh., and during the last week of Pot. Iod. gr. i + Ammon. Carb. gr. iv + Tr. Cinchon. flav. ʒj + Dec. Cinch. ℥j, *ter die*. Strychnia disagreed with him very much, each dose caused spasmodic pain in the upper part of his abdomen and a sense of coldness, with considerable trembling all over his body. On being questioned as to what he thought had done him most good, he replied, "that the opiate injection quelled the pain, but the faradization set all the circulation free, and gave him more power in the limb from its first application."

The points which I notice here are—(1) The absence of any constitutional derangement or any evident exciting cause. A healthy man is suddenly stricken with severe nerve disorder. This is more like an attack of influenza than anything else, as catarrh is no necessary part of the malady. Whatever may have been the precise nature of the cause, it is almost certain that it was an external one, perhaps what has been termed a 'cold-stroke.' Instead of taking an inferior tertiary centre and peripheral nerve-tract, might it not have struck higher, say at the solar or cardiac plexus, or at the hemispheres, and produced much graver results? (2) The almost complete motor paralysis, which was associated with the pain, and its speedy amendment under faradization. There can be no question that this paralysis was functional, and the most probable view seems to be that the morbid change, which expressed itself by pain in sensory fibres, appeared as simple loss of power in motor. It might, however, have taken the form of spasm or convulsion. (3) The loss of power in the expulsor urinæ. We may either explain this on the view of the motor nerves of the bladder being affected, as those of the limb, or on that of the general tendency of pain to cause paralysis of associated muscles. The sciatic neuralgia may have exerted an inhibitory action on the vesical muscles just as a frontal neuralgia does sometimes on the ocular. (4) The relation between the previous duration of the illness and the rapidity of the cure. The man had been ill about 3 weeks, and was cured in rather less. Had he been ill 3 years assuredly his recovery would have been much more tardy. "A maladie chronique il faut un traitement chronique." Patients and doctors too sometimes forget this. (5) The efficiency of simple symptomatic treatment. Pain was calmed by a sedative, palsy chased away by a stimulant. Such means will suffice when a morbific cause has ceased to operate, but of course would fail if it, being of internal or external origin, was still in activity. (6) The injurious effect of strychnia, owing to peculiarity of constitution. The frequency of these idiosyncrasies is not, I think, sufficiently appreciated.

Case 3.—W. S—, æt. 49, labourer, a tall, thin man. His family is consumptive; he is the 19th of a family of 27, of whom 15 lived to maturity. He is a weakly man, has always been ailing, but has been much better since he has been in London the last 7 years. He had chorea when a child, and has had it often since he has been married, 28 years ago; but he has been free from it the last 12 years. He had ague in 1826 for 3 months. He had been ill with sciatica when I saw him about 3 months; had been exposed to cold and wet. Pain was felt in the right hip, extending down the thigh and back of leg to the instep and sole of foot, not in the front of the leg. The pain is like that which would be produced by having the flesh gnawed off the bone. It comes on worse of a morning, is not constant, leaves him at times for a few hours, except a degree of "lingering" pain. It is worse in windy weather. It keeps him awake at night, sometimes all night. Is lively and in good spirits when he is not suffering, but when the pain comes on he gets very depressed and cries like a child; the pain has taken the courage out of him very much. The right buttock is flattened and is flabby, but the hip-joint is free. Urine, sp. gr. 1025, not albuminous; on standing it deposited much crystalline uric acid and oxalate of lime. The treatment which I commenced consisted of Liq. Potass. Arsen. ♏iv in Tr. and Dec. Cinchon., with subcutaneous injection of Liq. Opii Sed., but circumstances prevented its being carried out after a few days. I have thought this case worth recording as a type of an opposite condition to the preceding. The latter was a hale, sound man, who had no tendency to neuroses, and when attacked recovered quickly; the former was feebly framed, prone to failure of vital energy, had long suffered with motor nerve-disorder, and could not be expected ever to attain the integrity of the other. Such are the varying materials with which Medicine has to deal. Is it reasonable to insist on the natural history of morbid processes in systems so different?

Case 4.—Ch. S—, æt. 45, coachman's wife, seen October 21st, 1868. She had been operated on 2 years before for strangulated hernia on the right side. She has had 8 children and several miscarriages. Health generally very good. Seems of rather lax make. In July, 1868, she was lifting a very heavy saucepan from the fire, and in bending to put it down something caught her in the back, as if she had strained or put something out of place. She was immediately seized with cramp in the left thigh, which lasted about 2 minutes, leaving a severe pain in the back and left lower extremity, along the course of the sciatic nerve, "as if a heavy weight was pulling down her leg;" she was not able to put her foot to the ground, and had also a violent headache. She continued in the same state about 10 days, when the cramp returned, attacking her leg from the thigh and calf right down to the heel. She was treated with Potass. Iod. gr. x or gr. xx *ter die,* and Pulv. Doveri at night. The pain left her in about 6 days, and she continued nearly well for 14 days. The cramp and pain then returned quite suddenly in the same way as before. From this period she suffered intense pain. Whenever the pain in the back was very severe she experienced a burning pain in the vagina, which seemed to come from her back and pass round the groin to the vagina, from which she had a thick white discharge. This discharge and pain were subdued by alum injections and by the constant use of warm water. No treatment was of any avail to remove the sciatica, though Mr. Field, jun. (to whom I am indebted for this account), gave a fair trial to all remedies which could be thought beneficial. Subcutaneous injection of Morphia, increased at last to gr. i for each dose, was the only thing which materially relieved her suffering, and that only for 6 or 8 hours. At my visit I discovered a specially tender spot near the upper part of the left sacro-iliac synchondrosis, the same at which she felt she had hurt herself when she lifted the heavy weight. A copper disc heated 212° was applied to this spot so as to make an eschar. The next morning she was found sitting up in bed, looking very pleased at being able to move her back as she liked; the pain, however, was still felt in the leg. After this she improved for a time very much, was able to walk, and about Christmas she appeared nearly well. Subsequently, however, she began to suffer with general nerve-disorder, a heavy weight at chest, and great palpitation, with disturbed nights, the leg, however, remaining free from any acute pain. Bromide of Potassium was beneficial, but the symptoms soon recurred when it was left off. A second firing near the seat of the first was of no avail. It is probable that the disorder was set up in this case by the rupture of some ligamentous fibres during the strain, and that some nervous filaments became involved in fibroid tissue during the process of repair. In this or some similar way a focus of irritation was set up, which first was concentrated on the tertiary centre of the sciatic nerve and afterwards diffused itself much more widely. Removal of the source of irritation was what was really needed, but the 'firing' was unable to effect this, except partially and for a time. A surgical operation might have accomplished more.

CASE 5.—S. E—, æt. 20, servant, admitted September 29th. She had an attack of acute rheumatism 5 months ago with delirium at intervals during 3 weeks, and on recovery she was seized 16 weeks ago with acute pain in the left hip. This part has been repeatedly leeched and blistered without benefit. She cannot stand or sit, is extremely anæmic, and in the region of the sciatic nerve experiences violent pain much aggravated by pressure. There is no hip disease; the hamstrings are contracted and tense, the knee is bent, and the foot drawn up. Meat diet, cod-liver oil, and Pot. Iod. were ordered. The first night she passed as usual without sleep and tortured with pain. One eighth of a grain of Atropia was injected into the track of the nerve. She felt drowsy immediately after the injection and slept well all night. A second injection 3 days later removed pain, soreness, and contraction altogether. She was able to walk with ease, and was discharged well. (V. 'B. M. J.,' Feb. 11th, 1860.)

CHAPTER XXXVII.

MYALGIA.

In this disorder it appears to me that the sensory nerves of the muscles must be essentially implicated, as if they were not it is impossible to conceive how the pain which gives its name to the affection should be experienced. The muscles, it is plain, are weak and readily exhausted, their functional power is low. But if this were all, the phenomena would be simply those of paresis, or imperfect paralysis, and there would be no pain. The pain is like that of ordinary neuralgia in being calmed by repose, reproduced by exertion, and removed by nerve tonics. I therefore regard myalgia as a muscular neuralgia, and believe that it is to be treated exactly on the same principles as neuralgia in any other situation. The weak and aching muscles are to be rested sufficiently, but not left, on the other hand, without adequate exercise. The general strength and vigour must be promoted as much as possible by diet, air, and medicines. The following case is a well-marked instance:

Case.—S. B—, male, æt. 25. Ill three months. Pallid, of small make, ordinary temperament. Functions in fairly good order. Complains of pain at top and back of right shoulder, which ceases if he leaves off work for a few days, but returns again on resuming it. The seat of the pain is in the supra-spinal fossa. When passing his stitches in boot-making he feels as if the shoulder were pulled out of its place. Has been ordered warm baths without benefit. Under steady perseverance in the administration of quinine with iron, or strychnia, and ol. morrh., he recovered completely in about three months. During the last six weeks he was able to follow his employment. It is very easy to confound this disorder with chronic rheumatism, from which it is chiefly to be distinguished by its complete subsidence during repose and aggravation by exertion. The profession is much indebted to Dr. Inman, of Liverpool, for having first accurately described and distinguished it.

Myalgia explains very well the pains which are felt in many cases of severe cough, where the expiratory muscles are in constant and severe action. These pains might easily be taken for those of pleurisy, but, of course, would not be relieved by leeching or blistering.

The pain of myalgia may be very severe, as I can testify from personal experience, and its production by continued muscular exertion is a strong evidence of the correctness of the view I have taken—that pain is a paralysis.

LEEDS SCHOOL OF MEDICINE

CHAPTER XXXVIII.

CARDIAC NEUROSES.

These disorders are, on the whole, graver than those situated elsewhere. The literally vital importance of the heart sufficiently explains this. What would be a mere pain or inconvenience elsewhere, induces, when it affects the central organ of the circulation, a disquieting, unnerving consciousness of an interference with the mainspring of life. Even when this is slight and unattended with real peril, it is a source of uneasiness which is not easily removed by the most consoling assurances. It is very remarkable, however, that this uneasiness is, to a great extent, peculiar to neuroses, and is often quite awanting in grave organic lesions of the heart. Cardiac neuroses may be roughly grouped under the heads of neuralgia, hyperæsthesia, anæsthesia, inhibitory paralysis, direct paralysis, and palpitation. The motor disorders are mostly associated with, and more or less dependent on, the sensory.

Though our information relative to the innervation of the heart is as yet incomplete, it may be stated as tolerably certain (1) That the heart has nervous centres of its own situated at or near its base. (2) That these preside over the normal rhythmical movements of the organ. (3) That the heart's action is capable of being powerfully influenced by impressions conveyed to it from remote nerves or nervous centres, *e.g.*, from the brain, limbs, abdominal viscera. (4) That the vagi nerves are the chief regulators of its rate of action, which is slowed even to arrest by their stimulation, and rendered more rapid by their paralysis, the blood pressure in the arteries being lessened in the first case, increased in the second. (5) That the cervical sympathetic ganglia send nerves to the heart through which its movements may be quickened. Cyon states that there exists (in the rabbit) a special cardiac accelerator nerve which emerges from the spinal cord with the third branch of the inferior cervical ganglion. (6) Stimulation of the upper part of the spinal cord, the encephalon being separated, causes acceleration of the heart's action, and increase of the pressure of the blood in the arteries. The increase of blood pressure does not, however, depend on *direct* stimulation of the heart, for it does not take place, or but very slightly, when the splanchnic nerves are divided. Its real cause is contraction of the arteries of the abdominal viscera, which then expel the excess of blood, and so increase the amount in other arteries. (7) The internal surface of the ventricles is endowed with sensibility. Touching their interior greatly accelerates their contractions, of course by a reflex stimulation of the accelerator nerves of the heart. There is, however, a special nerve derived (in the rabbit) from the pneumogastric, and the superior laryngeal, which anastomoses with filaments coming from the first thoracic ganglion, and is lost in the dense tissue between the aorta and pulmonary artery. If this nerve be divided, stimulation of the lower end has no effect on the blood pressure at all, but stimulation of the upper is painful, and causes immediate diminution of the blood pressure in the arteries. This depends on a reflex inhibitory influence transmitted through the splanchnic nerves to the abdominal arterial plexuses. That such is the case is proved by the effect not being produced when the splanchnic nerves are divided; by its not being referable to altered cardiac action, as it continues when all the other cardiac nerves are divided, and its not being dependent on struggling as it persists when the voluntary muscles are paralysed by woorara.

Bernard remarks that by this mechanism the heart can regulate its degree of fulness in accordance with the state of the blood-vessels at a distance, over-repletion of the ventricles causing relaxation of the arteries in the abdomen, while the reverse condition favours contraction of the arteries, and so increase of the amount of blood in the heart.

Angina Pectoris.—My noticing this disorder among the functional diseases of the nervous system will show that I consider it to be *au fond* a neuralgia. Dr. Watson objects to this view:[1] (1) Because the paroxysm is excited by such causes as are especially calculated to disturb the natural action of the heart, bodily exertion, and mental emotion; and (2) because the disease is so very frequently and suddenly fatal, which is not the character of mere neuralgic diseases in general. To this it may be replied that exertion and mental emotion are causes which do very much increase, and even induce, various neuralgiæ. A gentleman about whom I was lately consulted suffered with an obstinate neuralgia of the side of the chest, which subsided on his remaining perfectly still, but was immediately reproduced by moving about. Neuralgia in other parts is not fatal just because the function of the organ is not essential to life. No one can be surprised that "tic douloureux," or sciatica, or the like, should not endanger life. Dr. Stokes,[1] from his examination of the subject, concludes that the special group of symptoms described as angina pectoris is but the occurrence, in a defined manner, of some of the symptoms connected with a weakened heart. Obstruction of the coronary arteries he considers as no necessary condition. According to this view, a weakened state of the heart is essential. I cannot agree with this, as I have certainly had patients under my care with considerably weakened hearts who presented none of the symptoms of angina pectoris. And again, I can adduce one, if not two cases, where after death from this affection the heart was found in a tolerably healthy state. Something there must be, I think, beyond simple weakening of the organ to account for the peculiar phenomena of the disease. It is, however, quite reasonable to believe that a variety of morbid changes may predispose to it, and, indeed, this seems to be the fair inference from the observations which have been collected by Dr. Forbes. This opinion seems to be that entertained by Dr. Copland. Dr. Latham regards the disease as spasm of the heart, insisting on its analogy to cramp in the voluntary and involuntary muscles, and on the efficacy of opium in relieving the distress. Lussana adopts the same view, citing an observation of Morgagni's, who found at an autopsy the heart "durum valde et robustum," and another one of Carron d'Annecy, where the heart was very much contracted. He thinks it demonstrated that the heart's muscular tissue during the attack is in a state of cramp-like contraction, and remarks that the character of the pulse, as generally observed, is in conformity with this view, being brief, small, hard, and often accelerated. (v. 'Schmidt's Jahrb.,' vol. cviii, p. 312.) Dr. Walshe[2] says that "angina pectoris seems to be constituted by spasm of the heart, and neuralgic pain," and doubts whether it ever occurs without some kind of structural change in the organ. It may be remarked that a cramp-like condition of the heart's tissue would quite as much interfere with its functional action as a paralytic state.

---

[1] 'Lectures,' vol. ii, p. 259.

[1] 'Diseases of Heart and Aorta,' p. 487.

[2] 'Diseases of Lungs and Heart,' p. 434.

It is quite as essential for the heart to relax duly to admit blood into its cavities, as it is that it should contract and expel it. The pallid face, sunken features, and feeling of impending dissolution may quite be accounted for on the view held by Latham. Lussana states, what seems scarcely in accordance with general experience, that after the attack the continued contraction of the muscular fibres is succeeded by languor, exhaustion of irritability, and finally paralysis,—to which even the pain itself contributes. Therefore the heart of anginose patients falls after the attacks into a condition of collapse, and the circulation is languid and feeble, so much so in some cases that the pulse and the heart's impulse become imperceptible, and the patient at last becomes faint and dies quietly. Dr. Stokes, on the contrary, speaks of the pulse during the attack as being almost imperceptible, and says nothing of any subsequent syncopal state. Morgagni and Carron found in two patients who died during the attack the right cavities completely empty, and the left ventricle nearly so, the pulmonary artery and the vena cava, on the contrary, distended with blood, which was black and quite fluid. In patients who had died in the intervals of the attacks coagulated or fluid blood was found in larger or smaller quantity in the cavities. Lussana regards the latter as indicating paralysis, the former tetanus of the heart. He thinks generally that the blood of anginose patients is but slightly coagulable; in one of my own cases the fluidity of the blood was remarkable. His final conclusions are that the disease may be dynamic or organic, but that for the most part it is the latter, being, in fact, produced by mechanical irritation of the cardiac plexus resulting from calcareous degeneration of the coronary arteries of the heart, or some similar cause. It is thus invariably a neuralgia, whose sole and constant seat is the cardiac plexus.

The three following fatal cases in which autopsies were made came under my own observation.

Case I.—J. O—, æt. 39, male. Seen December 15th. Always had a rosy colour. Never had rheumatic fever, but had pain in left temple, stopped by local applications. Has been ailing several months. About nine weeks ago had the first attack of pain in his chest, "it turned his face white." Up to November 16th, when he was admitted as in-patient, he had the attack once in two or three days. While in hospital he had a short hacking cough, pain in epigastrium extending up to the throat, increased by walking, which also brought on palpitation. Heart's action regular, loud diastolic bruit at base and apex, cardiac dulness not increased, impulse at times heaving and strong. Weak breathing all through both lungs. Urine healthy. Temper irritable. Left hospital December 8th in same state. When he came under my care he complained of a constrictive sensation at the epigastrium, "like a rope round him." The same sensation was brought on by walking to some extent. At times he had a dreadful amount of flatulence. Appetite very good, but is afraid to eat. Looks well. Pulse 54, weak, intermitting every now and then. Heart's action trembling, the contractions appear to be not steadily sustained. Ordered argenti nitrat. gr. $\frac{3}{4}$ + extr. hyoscy. gr. ij *ter die*, with ammonia, spt. æth. s. co., and tr. hyoscy. On 21st and 22nd he suffered much from pain in front of his chest during the night up to 4 a.m. On 24th he had pains in his chest as usual till 7 a.m., when he screamed out violently, turned over, and died immediately. I was informed that he had latterly had an attack twice or thrice daily, each attack lasting one hour; during this time the epigastrium was hard and swollen. In the intervals he was quite free from pain. Taking even very light food, or riding, or walking, brought on the paroxysms. In one of the latter, if not the last, the pain extended to the left arm, affecting it severely. He used to open his dress and rub his chest when suffering. His wife thought he had a tendency to insanity. *Post-mortem.*—Lungs quite healthy. Some fluid in pericardium. Heart about normal size, very decidedly flabby, muscular tissue appeared healthy, large loose clots in auricles. Aortic valves did not hold water, they were thickened, but quite flexible. Just above one of them, in the sinus of Valsalva, there was a large patch of calcareous deposit, about $\frac{1}{2}$ by $\frac{1}{4}$ inch, it lay close to the orifice of a coronary artery. The coats around were healthy. Mitral valve a little thickened, but quite efficient. Right valves healthy. Muscular tissue of the heart was markedly affected with fatty degeneration, the fibres full of minute oil molecules, and their nuclei broken up into masses or streaks of oily molecules. Liver and stomach quite healthy. Body in good condition, muscles of a good dark colour, and in a decided state of rigor mortis, which was not the case with the heart.

CASE 2.—Mr. H—, æt. 57, a stout, large-made man, had been to the races on 27th, and rather deranged his digestion as he thought with melons and champagne. He complained on 30th of a very distressing pain across the upper part of his chest, "as if an iron network was there instead of flesh," but there was no disorder of the sounds or rhythm of the heart. He was very fidgety and nervous, and anxious for relief, and of his own accord applied hot water to his chest, so as to raise a small blister. The pain in his chest came on while he was walking up a hill on 27th, and continued till his death. He had always a presentiment of sudden death, often spoke of it; his father died of disease of the heart. On 30th he had a dose of calomel + opium, some brandy, and ol. ricini, and one dose of soda + acid. hydrocy. dil. ♏iij. Shortly after this he died suddenly, just after leaving the night-stool. *Post-mortem.*—Lungs much congested, but crepitant throughout, and healthy. Heart of normal size, cavities open, containing as well as the large vessels much fluid blood, and scarce a trace of clot. The heart's tissue was rather flabby, of good colour, the muscular fibres of both ventricles showed only fatty degeneration of their nuclei, the bulk of each fibre was quite healthy. The subpericardial fat encroached to some extent on the muscular tissue in some parts, but the walls of the cavities were not thinned. The left coronary artery was extensively affected by atheromato-calcareous deposit, which narrowed at some parts its canal decidedly. The right coronary appeared healthy. The mitral and aortic valves were healthy, the others were not specially examined. No coagula in the large pulmonary vessels. Tracheal and bronchial mucous membrane was very highly congested and dark. The abdominal viscera all appeared healthy. The stomach contained a little fluid, its mucous surface was pale and normal.

Case 3.—X. Y—, a robust man, æt. 54, was under treatment a short time with inflammation of the left testis of moderate severity. It was getting better, and he was not otherwise ill at all. He had been under treatment on previous occasions, but had never had any serious illness. About the middle of the day he was suddenly attacked with severe pain in the region of the heart. His medical attendant had seen him the same morning, and found him apparently well. In fifteen or twenty minutes the man was dead. Six leeches had been applied on three separate occasions to the testis, the patient had suffered some mental anxiety, but was in tolerably good circumstances. At the *post-mortem* the rigor mortis was well marked, the body muscular, and in good condition. Heart flabby, its walls were perhaps rather thinner than normal, and its tissue of a less decided red. On microscopic examination some degree of fatty degeneration of the fibres was found, but not by any means enough to account for the fatal event. There was slight atheroma of the coronary arteries. Brain not examined. Thoracic and abdominal viscera healthy.

Remarks.—The morbid changes in these three cases were materially different, and yet the disease was in all I believe the same. In the first it is probable that the patch of calcareous deposit pressed on and irritated some nerve, which then exerted on the cardiac ganglia a depressing inhibitory influence. The degenerated muscular tissue would be all the more readily paralysed from its enfeebled state. In the second case there seems no adequate explanation to be given of the sudden supervention of the symptoms, as it must be supposed that the disease of the coronary artery had existed for a long time, and the heart, so to speak, must have become habituated to it. In the third case there appeared absolutely no cause for the fatal event. The occurrence of such cases as the last, the absence of any constant morbid condition in instances where organic disease is found, and the frequent existence of all kinds of organic lesions without any trace of angina, incline me very much to believe that the essential circumstance in the disorder under consideration is an attack of neuralgia, quite similar to that which would be unimportant elsewhere. This seems to be nearly the opinion entertained by Trousseau, and is further supported by the complete cures of the disease which have occasionally been accomplished.

Lancereaux relates the case of a male, æt. 54, whose aorta between the orifices of the two coronary arteries, which were considerably narrowed, presented an elevated patch of new formed connective tissue situated between the inner and middle coats; the outer coat at the corresponding part was highly injected, and the cardiac plexus in the same situation was covered by vessels, some of its fibres thickened by a kind of plasma, and some of its nervous elements wasted by pressure, as was shown by microscopic examination. A calcified tuberculous mass, the remains of a lymphatic gland, lay below, and was adherent to the recurrent nerve. The heart and its valves normal. This case seems essentially similar to the first of those related above (v. 'Gaz. Hebdom.,' 14, 1864).

Bernard tells us,[1] and the observation is highly important, that irritation of a posterior spinal root causes temporary arrest of the heart's action, continuing for fifteen to twenty seconds; he even intimates that in a weakened animal fatal syncope might be produced in this way. It is, however, noteworthy that cerebro-spinal neuralgia, however violent, does not (in the human subject) seem to have much tendency to induce syncope, whereas this is apt to ensue on irritation of the sympathetic plexuses. If we conceive such a pain as a severe gastralgia befalling the cardiac plexus we may well imagine that it would occasion arrest of the heart's action. In fact, angina pectoris is only a particular instance of inhibitory action, the breast-pang, like any other neuralgia, conditionating more or less complete paralysis of the muscle, to which associated motor nerves are distributed. If the paralysis of the cardiac muscle does not speedily pass away the attack is fatal.

I am much inclined to coincide with Laennec's statement, quoted by Romberg,[2] to the effect that "in a slight and moderate degree angina pectoris is an extremely common affection, and exists very often in individuals who are free from any organic affection of the

[1] 'Leçons,' vol. i, p. 269.

[2] 'Dis. of Nervous System,' vol. i, p. 126.

heart or of the large vessels. I have seen many persons who have experienced only some smart attacks, but of short duration, and who have afterwards been freed from them. I even believe that the influence of the medical constitution contributes to its development, for I have observed it frequently in the course of certain years, and I have hardly met with it in others."

The following cases may be cited as instances of angina pectoris minor:

Case 4.—T. J—, æt. 37, admitted Nov. 6th, 1868. He had served in the Crimean war, but was discharged from the army on account of bad health, having violent pain at mid-sternum and dyspnœa. Has had slight rheumatism, but never enough to lay him up. He complained of sharp pains in both breasts passing backwards, and of attacks of severe stabbing pain in the left side near the site of the apex beat occurring in paroxysms of 3 or 4 minutes' duration, and returning every 2, 3, or 4 days. The pain brings him up standing, forces him to stop and call out, takes away his breath. He had been subject to it 2 months. After the pain he has fluttering of the heart for 2 or 3 minutes. The pain and fluttering sometimes occurred at night. He had never fainted. The heart's sounds were quite normal, no hypertrophy. Pulse 63, weak and small. Urine normal. No pain in either arm at any time. No notable dyspepsia. A little râle at posterior bases of lungs. He was ordered Ferri Sulph. gr. iij + Myrrhæ gr. v in pil. ij *ter die*, and ether with sal volatile and ♏iij of Liq. Opii *quater die*, which last was changed for Pot. Iod. gr. ij + Ammon. Carb. gr. iv + Spt. Œth. So. Co. ʒss + Dec. Cinch. ℥i *ter die* at the end of a week. He improved very much and at the end of 3 weeks was discharged at his own request. A recurrence of the disorder took place, however, 3 days before he left.

There are no sufficient data in this case for determining whether the symptoms were of organic or inorganic origin. I am disposed to think that the latter was the case, on account of the marked and speedy improvement which the treatment produced. The patient stated more than once that he felt as well as ever he did in his life. That relapses should occur was only what one would expect supposing the disorder to be, as I am inclined to regard it, a rheumatic neuralgia.

Case 5.—Mrs. —, æt. 40. After her 6th confinement, now about 12 years ago, suffered from a severe gastric attack. This was followed for some years by violent sickness, retching, and throwing up of bile. No treatment had much effect until chalybeate waters were resorted to; after two seasons of their use, bathing and drinking, the vomiting was completely arrested. It returned at intervals, however, the 3 following years. The last of these was severe for about 3 months before Christmas. Soon after this she became the subject of another neurosis, consisting of periodical attacks of spasm (as it is called) referred to the heart. She becomes very breathless, and her pulse is very feeble, and (lately) her arms are forcibly extended and her hands clenched. The spasms are chiefly pains which are felt all over the præcordia. These attacks used to last 45 minutes, but are now brought to an end by chloroform inhalation in 4 or 5 minutes. They always come on regularly in the morning at the time of awaking; it may be an hour or two later some days than others. Mental agitation will bring them on at other times, but not exercise. Mental preoccupation and interest have some efficacy in keeping off the attacks, and so has change of place, which, indeed, has proved more beneficial than anything else. It is curious that she can bear carriage-driving, but not travelling by railway. After the attacks are over she is able to attend to ordinary matters. In other respects her health is fairly good; she has no spinal tenderness. She has never had any gout, nor her father, but a brother suffers with rheumatic gout. She is of large make, wanting in tone and colour. About 9 months after the date to which these notes refer, she had improved materially, was able to bear 2 or 3 hours' railway journey, and had gained colour and flesh. Her pulse was 87, weak. The first sound of the heart was very weak, the second not loud, the impulse decidedly feeble. No murmur to be heard. She had almost constant sense of weakness at the heart. Any cause of trouble excited the heart's action; exertion put her out of breath. She had much pain down the left arm, with crampy sensations. Pulvermacher's chain and Bromide of Potassium gr. 20 *ter die* had been employed pretty constantly during these 9 months, and after a short time an eruption of Erythema nodosum appeared on the legs. The spasms then almost entirely ceased, and at the last report I have there had been little but threatenings. The Bromide had been used before unsuccessfully in smaller doses, the larger were advised by Dr. W. Begbie, and it is most probable that to them the improvement was due.

The appearance of Erythema nodosum and its coincidence with subsidence of the cardiac disorder, is very interesting. I have mostly seen this eruption in connection with subacute rheumatism, and am generally inclined to regard it as an evidence of the existence of a rheumatic rather than gouty diathesis, but it is possible that, in this instance, it may have depended on the latter. The opinion of various eminent physicians who examined the patient was that the heart was sound. I do not feel clear altogether that the organ was exempt from fatty degeneration, but this can only have been an accessory cause of the nerve disorder. Regarding the heart and its nervous apparatus, as a whole, it is not improbable that defective nutrition might affect not only the muscular fibres but the nerves and nerve-cells also, and even predominate in the latter. The neurotic pathema would then depend on the state of the nerves solely, and not on the associated change in the muscle. The circumstance, however, that the cardiac neurosis succeeded to, it may be said, replaced a gastric makes it more probable that both depended on some general state of system. One considerable factor of this, I believe, was debility induced by successive pregnancies and nursings.

Romberg's statement that arthritis and hysteria are the chief predisposing causes of this disease appears to me by no means well founded, certainly at least as regards the latter. Gout is recognised as a cause by Trousseau, but not by Dr. Walshe. It has probably some but not great influence. A relative of my own who was gouty had frequent attacks and died in one, and one of his daughters suffered in the same way. Rheumatism appears to me to have much more relation to angina pectoris than gout has, and this may be the reason that certain states of cardiac disorder of anginose character are remarkably relieved by pot. iod. I am speaking here of the apyretic form of rheumatism, such, for example, as produces a stiff neck.

M. Beau has lately remarked on the production of an angina pectoris by the use of tobacco, and records 8 cases in evidence, two of which proved fatal (v. 'Jour. de Med. et de Chirurg. Pratiq.,' July, 1862). Judging from the action of tobacco smoking in excess on the retina, and from the effect of tobacco enemata, it seems pretty certain that this agent exerts in toxic doses a directly paralyzing influence on the heart.

In the following record we have various causes at work in production of the malady; all, however, such as depress nerve force. Malaria, chills, indifferent food, and probably tobacco, were pretty certainly concerned in the result. It can hardly be questioned that in the majority of these patients the disorder was functional, and capable of being entirely removed by such means as would restore the general health. The Embuscade corvette with a crew of 250 men during several years was rapidly passing and repassing between the cold latitudes of Chili or California and the hot climate of Mexico and Central America. These sudden changes of temperature, together with the careless mode of life of the men, and other injurious external influences had previously induced attacks of neuralgia, scurvy, and colic. After some days of stormy weather in the neighbourhood of St. Helena angina pectoris appeared. Most of the persons attacked were anæmic and scorbutic. The pain always began at the sternum, and was more violent in proportion as it approached nearer to the heart, which it always reached. It was attended with a sensation of imminent death. The patients had terror marked on their faces, and their bodies bathed in cold sweat; none, however, actually died. The pulse was for the most part slow and small; in many cases, however, the heart palpitated with extraordinary violence, and its impulse was forcible. During the attack the patients were unable to speak, and after it was over they spoke in a low voice and in single syllables. Eructation occurred in 8 patients after the attack, and gave relief; in 3 or 4 towards the close of the attack there were nausea and vomiting. Treatment consisted in cupping, the local application of anæsthetics, and the administration of narcotics (v. 'Gaz. des Hopit.,' 1862).

The *treatment* of Angina pectoris must depend a good deal on the view we take as to its dependence on organic lesion. If we can discover no removable cause capable of acting toxically, or in the way of remote irritation, if the age, history, and general condition of the patient oblige us to think it most probable that organic changes exist, we can propose to ourselves no other aim than to try to stave off the ever-imminent peril. The less the nervous system is taxed in such cases the better. Anxiety, luxury, and emotional excitement must be warded off as much as possible. The stomach must be kept in good humour, neither debilitated by poor innutritious diet, nor offended by indigestibles. Tea and tobacco should be tabooed. Exertion of any kind, mental or bodily, after a principal meal should be discouraged. Cordial draughts containing Spt. Œth. S. Co., Opium and Ammon. Carb. should be always at hand, as well as some mustard paper.

In the management of states where we have most reason to refer the pathema to some diathetic disorder, to rheumatism, gout, malarious intoxication, neuralgia, we must be guided by the circumstances existing in each particular case. If we find there is a rheumatic tendency, small doses of Potass. Iod. with Ammon. Carb. and bark are likely to be very serviceable. In states more simply neuralgic iron and quinine, as sulphates, or citrates, or valerianate of ammonia, will be preferable. In both Ol. Morrh., if tolerated by the stomach, is also desirable. A case has lately been recorded by Philipp (v. 'Syd. Soc. Year-book,' '55—'56, p. 172) in which arsenic acted admirably. The patient suffered for 8 years with severe paroxysms, which were evidently connected merely with the condition of the nervous system, and which were more severe always during the state of depression induced by high summer heat. During the 8th summer, which was extremely hot, the attacks became so frequent and severe as to threaten a rapidly fatal issue. Almost every medicine had been tried with little good effect, but at this extremity Liq. Pot. Arsen. was given in ♏ij½ doses with great and immediate improvement. The paroxysms were so much mitigated that the patient almost ceased to complain of them, and the appetite, which had been very bad, greatly increased. During 18 months the patient remained comparatively well except when attempts were made to leave off the arsenic, the dose of which had to be increased gradually to about ♏v *ter die*. At the end of this time the attacks recurred, were replaced before long by severe head symptoms which proved fatal. The value of arsenic is so well proved in rheumatic and neuralgic affections that it seems no more than might be expected that it would also be of avail in angina pectoris especially of the uncomplicated nervous type. The chest should be well covered, and in cold weather wearing a chamois leather vest next the skin is really a comfort to a weak heart. In gouty persons the effect of colchicum combined with camphor, and perhaps ammonia, may be cautiously essayed. Bretonneau obtained good results from the administration of Sodæ Bicarb. and Belladonna continued for a year or more. The alkali is given in increasing doses for 10 days, then in decreasing for the same time. It is to be taken before the principal meals in doses of 15 grains to a drachm. The belladonna is to be given in increasing doses unless some toxic effects are apparent, and to be continued without interruption (v. Trous., 'Cliniq. Med.,' Vol. II, p. 452).

Trousseau cites two interesting cases of anginal seizures; one from the practice of M. Duchenne, the other from that of M. Aran, which were treated most successfully by faradization of the nipple (probably the left) during the paroxysms with a very strong current. The application was only of 1 to 3 seconds duration, but it was repeated several times at short intervals, and after each repetition the anginal tendency became less and less, so that the malady before long was almost completely put an end to. The attacks were induced in one case by any movement, in the other by painful emotion. The symptoms were acute, deep-seated, burning pain with a constrictive sensation felt at the upper part of the sternum, radiating into the left arm, where it produced numbness and formication or paralysis. The pain was exasperated by raising the head and drawing the shoulders backwards. The breathing was short and frequent, and there was extreme anxiety. In one patient the heart palpitated violently.

Before passing on to other neuroses I would remark shortly on the great influence of gastric disorder on the heart. This is a matter of the commonest experience, but it seems to be by no means sufficiently explained. In the first place I think it must be allowed that mere flatulent distension of the stomach disturbs materially the action of the heart, the relief procured on dispersing the flatus being immediate. I should be much inclined to ascribe this disorder of the heart solely to inhibitory action of the gastric nerves, were it not that it is certainly aggravated by lying on the left side, which by bringing the weight of the liver and other viscera to press on the stomach pushes it upwards against the diaphragm and the heart. The cardiac uneasiness from this cause sometimes takes the form of a sharp præcordial pang, which forces the person to turn immediately from the left side position from the sensation that if he did not the heart's action would be arrested. The distress in this case seems to be of mechanical origin. There is certainly, I think, some peculiar relation between flatulency and cardiac disorder. A gentleman whose heart is apparently free from organic disease, and who has no gouty tendency, but some rheumato-neuralgic, finds that when he has been debilitated by various causes, over-exertion in walking produces a tendency to syncope and flatulence. It appears as if both resulted from the same cause. He has no dyspepsia, but has found that sudden mental excitement or emotion will suddenly bring on flatulency when he was previously quite free from it. The extraordinary rapid development of flatus (rectal) which occurs not uncommonly in malarious dysentery, ceasing as suddenly as it commenced, and taking the place of diarrhœal discharge is almost sufficient to prove that flatulent disorder may be dependent upon nerve affection. No one can, I think, have had to deal with these cases without being impressed both with the neurotic character of the disorder, and the utter insufficiency of any mere decomposition of intestinal contents theory to account for the phenomena. From my own observation of both gastric and rectal flatulence, I am much disposed to lay down as a proposition, that mucous membranes under the influence of enfeebled innervation may secrete large quantities of gas. Trousseau[1] affirms that flatulent distension often occurs quite independent of fermentation. Cardiac distress and debility may be co-results of the same nerve disorder. The best remedies for cardiac uneasiness, depending on flatulence, are creasote in pills with quinine and a little ginger, or creasote in solution with muriatic acid and tr. calumbæ. The following case is a well-marked example of the association of cardiac and gastric disorder :

Case 6.—M. L—, female, æt. 53, admitted January 23rd, ill three months. Complains of dreadful palpitation of the heart mostly felt at night, preventing her from lying down or getting sleep for hours, sometimes she can hardly breathe. The palpitation causes a hammering noise in head. Has much flatulence and spasm at the stomach (severe pain darting from between the scapulæ to the sternum, and up into the neck). If she can disperse flatus is easier. Food does not digest, turns to wind. The heart does not appear enlarged, there is a loud rough systolic bruit at the base extending some way along the aorta, second sound distinct lower down, rhythm normal. She says the heart seems to stand still at times. Is very weak, always thirsty. Epigastrium very tender. Takes no tea. Has prolapsus ani. Nitrate of silver with henbane was given with good effect in calming the excited action of the heart, but muriatic acid with prussic and inf. calumbæ was rather prejudicial, a combination of strychnia, ferri sulph. and tr. zingib. proved however most useful. As long as she took it she had tolerable appetite, and was able to digest and to lie down and sleep at night. The heart's action became much quieter, and the pulse notably *weaker* than it had been at first. Stout she found beneficial, but had to omit it occasionally. Mutton, cocoa, and bread she was able to digest very tolerably.

In this case it is quite certain that the gastric disorder as well as the cardiac was a neurosis. Had it been otherwise, the strychnia and iron would surely have proved the reverse of beneficial. Flatulent distension of the stomach no doubt aggravated the cardiac disorder, but did not originate it. Both were I believe co-results of the same neurotic condition, and both were benefited by the same treatment. The calming of the excited heart's action under nervine tonics is a curious and interesting phenomenon, and almost necessarily suggests to us the opposite results of dividing and galvanising the pneumogastric nerves. In one very marked instance which occurred to me many years ago the patient had had diarrhœa, vomiting, loss of appetite, and sleepless nights for two or three days, she was very weak, inclined to faint, and felt as if she would sink through the bed on which she lay; yet the pulse was regular, large, rather forcible, 100. Under quinine 9 grains a day, she gained much strength, and the pulse became weaker, from the heart acting more quietly. The effect of large doses of quinine in slowing the pulse is very similar to that of galvanising the pneumogastrics, and the result is probably attained through the same channel. It is in instances of the kind above related, well known to practical men, that we have good examples of the truth of the distinction made by Barthez[1] between *radical* and *acting* forces. The former may be nearly exhausted while the latter are in full play; and *vice versâ* the latter may be but slightly manifested while the former are powerful. The amount of the radical forces represents a person's capacity of vital resistance to disease and to fatigue. Two persons may have the same apparent strength and capacity for action, but one, to use an expressive term, has much more "last" in him than the other, withstands fatigue much longer, and resists hardship and morbific causes much better. The acting forces, according to Barthez, have their origin in the radical, and these are especially increased and sustained by quinine and other tonics, though of course they are dependent essentially on the due maintenance of the various vital processes by food, pure air, repose, &c. It is very noteworthy that there is often a distinct consciousness in the system that these radical forces are failing. The pulse and respiration may be good, there may be no evident signs of impending collapse, and yet the patient may feel that he is gravely stricken, and have a presentiment of dissolution, which is not unfrequently verified. I well remember myself during the cholera epidemic of 1854, a full hour before I was attacked with a form of the disease, laying down the pen as I was writing at night surprised at the sudden strong presentiment of death which came over me. My mind was quite calm and clear, my bodily functions were unaffected, and I looked upon the feeling for some time as a curious psychical phenomenon. This, however, by way of digression.

---

[1] 'Cliniq. Méd.,' vol. ii, p. 354.

The cases I propose to relate may be distinguished as rheumatic, malarious, saturnine, connected with "goitre exophthalmique," and epileptoid.

CASE 7.—C. R—, æt. 35 (?) of sanguine habit, but rather weak nerve-power, had been exposed to cold more than once and suffered from stiff neck, and a most unaccountable *malaise*. His digestion was usually good. Four days later, having had a fresh chill in the interval, he took a hurried meal, and on returning had a nap as usual. He awoke with a very curious sensation of spasmodic choking all along the œsophagus. He went to bed and felt somewhat relieved by the warmth, so that he slept for about one hour. He then awoke in the most excruciating pain, could only lie in one position, viz. on the back, slightly inclined to the right side with the left leg drawn up. He could not breathe without great pain. "I dared not," he says, "close my eyes from experiencing that most awful sensation as if my heart would cease pulsating; the agony I went through that night baffles all description." For two hours he was involuntarily kicking, though well aware that he was doing so he seemed to have no control over his limbs; and if he chanced to kick himself the feeling was a most curious one—"as if one leg did not belong to the same body." A mustard and turpentine poultice to the chest afforded some relief. When I saw him early the next morning the pulse was excited, the tongue pretty clean, urine scanty and high coloured, sounds of heart and lungs healthy. He took calomel and opium of each gr. ij immediately, and had his chest rubbed with a liniment of aconite and opium. After sleeping two to three hours he awoke and began to take muriate of ammonia and bicarbonate of potash *quater die*. The next day the urine deposited a lateritious sediment, he was much better, and in forty-eight hours from the time I saw him he was convalescent, and had no relapse. Both before and after this attack he has suffered from rheumatism, muscular and periosteal.

---

[1] 'Traité de Thérapeut.,' par Trousseau et Pidoux, vol. i, p. 43.

In this instance it is quite certain that the disorder was a rheumatic neurosis, and that there was nothing whatever imaginary in it. The nervous and muscular apparatuses of the heart and œsophagus were especially involved, as well as the intercostal nerves. If we suppose that in ordinary circumstances the rheumatic disorder in the above case would have assumed the form of intercostal neuralgia it is not difficult to understand how, by extending higher up the cord, it may have involved the centres from which filaments proceed through the cervical ganglia to the cardiac plexuses, and also those of the vagi nerves, which innervate the œsophagus. The involuntary kicking seems to have depended on an excited state of the lower dorsal and lumbar cord, the action being of a somewhat reflex character. The altered sensation was probably also due to central disorder. The case seems to me of interest from the evidence it affords that neurotic as well as febrile rheumatism has a tendency to affect the heart.

Case 8.—M. A. W—, female, æt. 44, admitted March 12th. Resides near Uxbridge, no ague in vicinity. Had rheumatic fever two years ago, since which time her heart has never been quite right. Ill now one month. States that at 10 a.m. and 7 p.m. daily she experiences a sense of fulness in præcordia, and of faintness, with pricking and shooting in the same situation, and "deathly feelings." She can't lie down well at night. The heart's action is now quite normal and the pulse also. She is a stout person, rather full coloured. Appetite is bad, she has thirst, but her food digests fairly. Bowels open. Urine sometimes thick. Tea twice a day. Tea was forbidden, and she was ordered creosote and rhubarb in pills *bis die*, with ferri pot. tart. + pot. iod. + pot. bicarb. + inf. calumb. *ter die.* 26.—A great deal better, pain at heart nothing like what it was, nerves much better, urine clear. She continued in an improved state, but with some relapse from exertion in nursing, and on April 20th the mixture was changed for pot. bicarb. + spt. ammon. co. + inf. gent. co. On this she kept very well as long as she persevered in taking it, but if she omitted it and the pills for two days the symptoms recurred. June 11th.—She described the attacks, which came on when the medicines are omitted, as follows:—"The heart feels so cold as if it lay in cold water, she feels a stifling sensation which obliges her to get up and go into the open air, her sight gets dim, her head feels lost, and all her senses leave her." The attacks last half an hour and occur at irregular times now. After this she took F. + citr. + pot. iod. gr. ij *ter die*, with which she benefited very much, and by July 2nd was fairly recovered.

I regard the disorder above described as of rheumatic nature from the previous attack of rheumatic fever, which probably inflicted some damage on the nervous apparatus of the heart, from the good effect of pot. iod. and alkalies, and from the occasional lateritious state of the urine. I believe, though I cannot put my hand upon the notes of the case, that she had a son who died soon after of rheumatic heart disease. In her case the affection was evidently a neurosis, and, though quite controlled for the time, I think it is highly probable that it will return, and may be aggravated by gastric disorder or the like so as even to end fatally.

The next group are instances of malarious infection.

Case 9.—M. S—, æt. 41, of active but nervous temperament, latterly residing in London, but having lived for many years in Australia, was subject to winter bronchitis. January 9th.—Having had on the previous day marked symptoms of commencing catarrh, she was attacked about 8 a.m. with distress referred to the heart, a sensation as if she were dying, breathlessness, and anxiety. I saw her about 10 a.m., when I found the pulse at the wrist almost utterly gone, the hands cold, the same distress continuing. The action of the heart on auscultation was very rapid, the sounds normal and loud, the face pale, and the eyes sunken. Her voluntary muscular power was not materially impaired, she sat up readily, and stretched her limbs vigorously. More than once she expressed a dread of going to sleep lest she should never wake again. She seemed too restless and anxious to sleep or lie down. Stimulants were given freely, mustard poultices applied to the præcordia, and the interrupted current passed from the nape of the neck to the same part. Very little improvement was produced for some time, the pulse continued fluttering and most indistinct, but at last warmth began to return in the hands, and the pulse improved. She took gr. iij of quinine at 11 a.m. and 1.30 p.m. For a good while before and after the latter hour the cerebral functions were much disordered. There was evident delirium. About 4 p.m. she became much quieter, but complained of extreme weakness. The pulse was 108, of tolerable force; the tongue remained clear, but appeared to her to be dry, though it was fairly moist. She vomited once about the middle of the day, and coughed up a few times a little phlegm; but almost all the catarrhal symptoms had disappeared; 10 p.m. complains of extreme debility and perspiration breaking out. Quinine gr. iij at 5 and 9 p.m. In the course of the next day gr. iij of quinine were taken, and at the same rate for another half day. She then had a little calomel and rhubarb, after which she slept well. No medicine was now given till the 15th, when she began citrate of quin. and iron, gr. v. *ter die,* which she took for nearly fourteen days, and was quite well by 30th. The cardiac symptoms never recurred severely, but she had more than once uneasy sensations about the chest, which made her fear a relapse, such as fluttering action of the heart and great weakness. One of her daughters about the same time had an attack of bronchitis attended with a decided aguish disorder recurring every morning, consisting of shivering and depression and ceasing under the administration of quinine together with the bronchitis.

February 3rd.—M. S— was attacked again about 11 p.m. with decided rigors, and violent beating of the heart in repeated paroxysms, with great depression and mental disturbance manifested as before by constant loquacity, and a tendency to repeat the same question over and over again. The pulse at 2.30 a.m. when I saw her (4th) was soft and quick; the skin fully warm; the tongue parched and dried up and coated. She complained of breathlessness, threw the clothes off her, her legs fell as if they did not belong to her, and her hands tingled. I gave her liq. opii sed. + spt. æth. chlor. and the symptoms gradually subsided. At 7.30 a.m. she began to take quin. dis. gr. ij *3tis horis.* 5th.—Was better all yesterday until 11 p.m., when the same symptoms recurred, but less severely. She got some tolerable sleep, but experienced in the morning some disorder of the heart's action with a feeling as if she were dying. This subsided after some time, and she remained till the afternoon weak and depressed. She was cinchonized. 7th.—After a tolerable day on 6th—the appetite, however, being very bad—she began to have about 9 p.m. "internal tremors," and exceeding restlessness, which passed into high fever, and was succeeded by profuse sweating, when she at last got to sleep. This morning is very weak and prostrate, with utter aversion to food and much nausea. Ice to swallow, and mustard poultices to epigastrium. On 8th resumed quin. dis. gr. ij *ter die,* and on

10th began ferri and quin. citr.; this she took with benefit for four days, and then went to the country. She returned in about a month much improved, but having still in the evenings slight but distinct paroxysms of aguish character. November 7th.—Up to about this date she continued well and active; she woke up about 2.30 a.m. with palpitation and distressing uneasiness at the heart and pain at the back. I saw her at 4.30 a.m. and found the heart beating rapidly, its sounds very clear and sharp, the pulse thready and indistinct, and the hands coldish. She was wakeful, and afraid to sleep, her legs felt as if they did not belong to her. After two doses of chloric ether + liq. opii sedat. the pulse became more distinct, the pain in the back less, the hands warm, and she went off to sleep. With quinine and iron she was well in about ten days. It is now nearly six years ago since these attacks occurred, and there have been no signs since of any serious heart affection.

I have the most perfect assurance that in the above case there was an entire absence of all hysterical fancy. The patient had passed much of her life amid the stirring scenes of a colony, and was one of the last persons in the world to plague herself and others with imaginary disorders. She had once been accidentally poisoned with sulphate of zinc, and had never had the same health since. She had also once suffered with a head affection from excessive heat which subsided after an eczematous eruption had appeared on the scalp. The first attack, which was the severest, had a very serious aspect; her own apprehensions of impending death were very strong. I was puzzled by it at first, as I could not see why the pulse should be absent while the heart was acting violently. In the subsequent attacks, when I had a clearer notion of the causation of the phenomena, the course to be pursued was apparent. The attack was in fact essentially the cold stage of an ague, in which, owing to a peculiar irritability of the vaso-motor nerves, the arteries were unusually constricted. The circulation was thus seriously interfered with, and the heart had to struggle against the obstruction. As soon as the arterial spasm yielded the difficulty and danger was over. The cerebral disorder shows how specially the nervous system was affected by the poison. In the subsequent attacks there seems to have been less spasm of the remote arteries than in the first, and perhaps the cardiac plexus was more directly affected. The feeling of impending dissolution assimilates the state a good deal to angina. It is worth remarking that in this instance, as well as in Case 7, there occurred the peculiar symptom of not daring to sleep, and of the lower limbs feeling as if they did not belong to the body. The apparent relation of the disorder to influenza, its distinctly aguish character, and the occurrence of aguish bronchitis at the same time in another member of the family are points of much significance.

The remarkable case related by Dr. Stokes[1] seems to me to have resembled the one just recorded. In the former, a rather mild case of maculated typhus, the heart's impulse was strong and the sounds remarkably distinct on the 8th day, and continued so until the 15th, though no pulse could be perceived at the wrist. The surface was icy cold, and of a violet hue, the countenance sunken, and the skin and breath cold. Stimulants were of no avail. On dissection no organic lesion of any kind could be discovered in any part of the body, the heart was firm and its muscular structure natural; no obstruction existed in any artery, but the whole quantity of blood seemed much diminished, its consistence was somewhat pitchy, and its colour very dark. The wound made in the arm (for injecting blood) was still gaping, and presented not the slightest appearance of adhesion or inflammation. Knowing as we do how weak a contraction is sufficient to send a pulse-wave through *open* arteries, I cannot conceive that in this case the vessels were free from obstruction, and as no embolism, &c., was found at the autopsy, it seems pretty certain that they were occluded by spasm of their circular coats, which naturally disappeared after death. This view is strongly supported by the icy coldness of the surface, and of the breath, phenomena which are rarely if ever observed except under such conditions of the nervous system as exist during the algide stage of fever. Had the failure of pulse been owing to cardiac debility the organ would not have been found firm after death, nor would stimulants have been so ineffectual. The warm bath would probably have been the best remedy as it proved in a case to be presently mentioned. The observation is one of great importance as showing that algide symptoms, the result of vaso-motor nerve irritation, may occur in typhus fever. On talking this case over with Sir R. Martin he made the sagacious remark that the patient must have had malarious disease previously. Nothing is said about it, but it is highly probable.

Case 10.—X. Z—, male, æt. 35, had previously suffered from ague and from recurring neuralgia, and had just returned from a malarious district. About the middle of the day he was attacked with faintness, and after taking some ether vomited. The syncope increased and became alarming, requiring the frequent administration of restoratives and friction to the surface. In the evening he had a dose of calomel and a rhubarb draught. The night was sleepless, and the next day he was very prostrate, remained in bed, unable to eat or to exert himself. In the evening another attack of syncope came on, from which he was rallied as before. Ten grains of quinine were now given, and early the next morning ten more. He was feverish in the night, but with an opiate had some sleep. The next day he was better, had no faintness. From this time he gradually recovered, but was unfit for work for some time. Several years have elapsed since the above illness, but there has been, I believe, no recurrence, nor any indication of disease of the heart.

---

[1] 'Dublin Quar. Jour. of Med. Science,' 1839, p. 7; and 'Dis. of Heart and Aorta,' p. 384.

Recamier cites two very instructive instances of the same character as the foregoing. In the first, a man, æt. 55, of good constitution, felt some lipothymic symptoms, which soon ceased, and recurred the next day at the same hour. No preventive means were used, and in the third attack the man died. No adequate cause for the fatal event could be found at the post-mortem. In the second, a young lady, æt. 19, was affected in the same way, but after the second attack bark was administered rapidly in full doses, and she was speedily cured. Torti relates ('Therapeut. Spec.,' p. 435) a case of syncopal tertian which appeared almost utterly desperate, but yet after the last rites of the Romish Church had been administered, the patient was snatched as from the jaws of the grave by the use of bark. Hamilton mentions [1] a case of "terciana syncopal," occurring in Peru. The subject was a negro, æt. 40, with a finely developed head, who managed an estate for his master. He was as usual in the field in the morning, when he fell on the ground and was conveyed on a mule to his master's house in town. When first seen after his arrival he was more like a corpse than a living man; the pulse at the wrist was scarcely to be felt; skin cold and dry; little or no shivering; speech lost; but his vision and hearing appeared intact. The first thing done was to put the patient into a warm bath, which seemed to operate as a charm, for the breathing became freer, the pulse rose, and speech returned. After leaving the bath the hot and sweating stages of the disorder appeared. It was ascertained that the bowels had been confined several days. He was freely purged with calomel and rhubarb, took quinine, and was well in ten days. It is stated that such cases there are generally fatal, and that those who are taken ill are given up for lost. Trousseau ('Clinique Medicale,' vol. ii, p. 763) mentions two cases in which death seemed actually to have taken place, but which were, nevertheless, restored by bark. Cardiac paralysis was, no doubt, the cause of death in some of the cases at Walcheren, of whom Sir G. Blane says, "under the influence of the endemial air recoveries were slow and imperfect, and relapses very frequent, so that some of the convalescents, when apparently doing well, would unaccountably drop down dead." Slighter degrees of the same affection are, I believe, by no means uncommon as sequelæ of malarious fevers. In a case of remittent fever under my own care the patient was attacked one night by an alarming sensation referred to the heart, attended with faintness and a failing pulse. He thought himself dying, and said it seemed as if life was ebbing from him. After he had become convalescent this cardiac disorder continued to recur about every second day, and was especially induced by any painful emotion or agitation. As the testimony of an independent observer is of great value, I subjoin an abbreviated account of an attack in which this same patient came under the observation of Dr. Symonds, of Clifton. He was called one afternoon to see him in haste, and found him, he says, in a rather puzzling condition. "There were indications of some very distressing sensations about the præcordia, he pressed my hand against his side as if suffering some spasmodic pain." He had complained the day before of pain in the heart. "He was, however, so very delirious, that one could not be quite sure that the local feeling was not some delirious dysæsthesia. His pulse was weak, small, not quick, hands and feet cool, head hot, eyes suffused. He talked deliriously of matters in which he had been engaged some months before." Dr. Symonds doubted whether some decisive remedies should not be applied to the head, but, guided by the state of the circulation and the character of the neurotic symptoms, he ordered for him brandy, a full dose of calomel + opium, Hoffman's ether and ammonia. Five hours later he was much better, quite conscious, had passed an enormous quantity of pale, limpid urine, but still had pain in the region of the heart. "The case was now clear,—feeble heart, pseudo-angina pectoris, and a neurotic diathesis, heightened and disordered by the malarious influences to which he had been subjected. With quinine, valerianate of zinc, creosote, and opium, and occasional alterative doses of calomel, he was soon convalescent." I was consulted in the case of a young officer, a model of physical conformation, and apparently in good health, who had been the cock of Eton, but after his return from India suffered with such a distressing dysæsthesia referred to the heart, that he could not walk a mile without feeling that death was imminent. There was nothing apparently wrong about the action of the heart, nothing to be detected on the most careful examination. Yet I do not think he was malingering both from his serious alarm about his malady, and from his not applying for any certificate to prolong his leave of absence. Sir R. Martin informs me that cardiac debility, as marked by an intermitting pulse, is an extremely common result of residence in India, and my own observation of returned Indians has generally shown a markedly weak state of the circulation. Whether this debility affect the nervous apparatus of the heart solely, or its muscular tissue, or, as is most probable, both, I do not undertake to decide. There can, however, be no question that the nervous system is principally implicated; no one can have had much to do with malarious disorder without observing how large a part the nervous system plays in the multiform phenomena that present themselves. The treatment of these cases is in one respect plain enough, viz., that they require invigorating tonic remedies, among which we must always rate highly pure air and generous diet. But in another respect, and that one which may be of momentous importance in perilous cases, our course is not so clear. Supposing in an attack of cardiac angina of presumed malarious origin we find the heart's action very depressed, and we dread death from its failure. This condition may arise on the one hand from irritation of the sympathetic plexuses causing constriction of the coronary arteries, and so depriving the heart of an adequate supply of blood; or it may depend on a paralysis of the cardiac nervous centres and nerves. In the first case sedatives would be needful, in the second stimulants. The diagnosis must, I think, chiefly rest upon our being able to ascertain whether or not the affection can be regarded as coinciding with the algide stage of an intermittent, as marked by the usual signs. If so it is probable that the coronary arteries are in a state of constriction, and we may either give opium with chloric ether, and a warm bath; or if the distress is less urgent wait till the spasm spontaneously subsides. In the other case repeated doses of digitalis would probably be advisable, together with free stimulation. In doubtful instances it will be safest to give stimulants, and to apply an effectual mustard poultice to the præcordia. This may, by its powerful excitation of the cutaneous nerves, both arouse the cardiac centres, and remove the irritation of the sympathetic plexuses. It sounds rather contradictory to talk of removing a state of irritation in one set of nerves by setting up irritation in another. Yet, as a matter of experience, it seems true that such may be the case. The common practice with the laity of applying a mustard poultice for the relief of all sorts of pain, including neuralgia, is not so bad as at first sight it would appear. Duchenne, quoted by Trousseau ('Tr. de Therap.,' vol. i, p. 787), says, "It is a capital fact that a sharp and sudden pain excited at any point of the cutaneous surface possesses the property of modifying profoundly certain sciatic neuralgias." The matter may be put in this way. When we feel a pain or have an irritation in any part, all that we can say is that the nerve or nervous centre belonging to that part is in a morbid state, which is generally functional and removable. Now, if we transmit through some other nerve a strong excitement of a different kind to that centre, we may succeed in abolishing the original morbid action, supposing it to depend on no actual organic change. We all know how any matter that interests us much makes us unconscious for the time of any minor disorder, and cases are on record where a strong mental emotion has dissipated actual articular gout. The virtue of emetics in certain inflammations depends on their action on the nervous centre of the inflamed part. In giving opium in any case of cardiac affection we should be guided very much by the degree of pain. Should this be severe, we may give a moderate or full dose, ♏ xxv—l, but if the syncopal tendency predominate we should be very cautious in giving opium, lest we increase the depression. The good effect of the warm bath in Hamilton's case was very striking. It acted, no doubt, as a relaxant, opening up the arteries and allowing the circulation to run freely. Of course it should not be so prolonged, nor the temperature so elevated, as to cause faintness. In the case of X. Z., case 10, on the contrary, I am much in doubt as to the exact state of the heart; the general tenor of the phenomena was much more that of direct depression and semi-paralysis of the organ than of arterial constriction and anæmia. I have been the more inclined to notice the point I have just referred to, as it has occurred to me in some painful instances to observe the utter inefficiency of stimulants when sinking had set in. Brandy poured down as long as the patient could swallow had no effect. Of course I do not doubt the value of stimulants in states of depression, but I cannot avoid posing the question whether failure of cardiac action may not arise in different ways, in one from direct paralysis of the cardiac nervous centres and nerves, in another from irritation of the vagi, or of the medulla oblongata, and in a third from general arterial constriction combined, or not with a similar state of the coronary vessels.

---

[1] 'Hamilton's Practical Observations on the Intermittent Fever of Peru.' Highley, 1842, p. 27.

The following instance of cardiac disorder was confidently referred by the patient to the use of lead under his anvil, and he has had no relapse since the lead was removed. I do not, however, feel absolutely convinced that the case was one of saturnine intoxication, as the gums presented no blue line, but I think this is the most probable view. Lead was found, I believe, in a quantity of powder removed from under the anvil.

Case ii.—J. R—, æt. 28, a hearty man, admitted December 27th, ill fourteen days. Was attacked between twelve and one at night while asleep with great palpitation and giddiness, great weakness and sense of illness; has had palpitation more or less ever since. No bruit about the heart, nor enlargement; its action is excited. Lungs healthy. No dyspepsia. Tongue coated, clammy; bad taste in mouth; some thirst. No epigastric tenderness. Was quite exhausted by walking about two miles to the hospital. States that he works as a smith at an anvil beneath which is a piece of lead to deaden the sound, which lead gets cut up into dust and gets into his throat. His employer affirms that men have been destroyed by this kind of dust. He has been exposed to the action of the lead four months. He was ordered strychnia, iron, spt. æth. S. Co. and henbane, and improved, but on returning to work found that "it almost killed him." There was then slight paralysis of two fingers of the right and of one of the left hand. Is pallid, nervous, weak, and tremulous. He was now (January 6th) ordered ammon. carb. + tr. nuc. vom. + tr. opii ♏v ex inf. gent. co. *ter die*, with ferri carb. saccht., under which he nearly recovered in a month and was at work (without the lead) the last week.

Mr. Pye Chavasse records[1] a remarkable case of great nervous prostration with right side anæsthesia, anxiety and palpitation of the heart (which was sound) on the slightest exertion, which seems certainly to have been occasioned by the use of water impregnated with lead. "The blue line on the gums, if not altogether absent, was at all events very faint." In my own case, as in Mr. Chavasse's, it is a strong point in favour of the lead poisoning view that the patient recovered so completely after removal of the presumed cause.

---

[1] 'Brit. Med. Jour.,' April 23rd, 1859.

Had it been otherwise, had he suffered from foul air, general debility, influenzal miasm, or any other depressing cause, he would have been much longer in recovering, and would in all probability have relapsed. He is now strong and hearty. In such cases the cardiac nervous centres seem to be directly affected, to be semi-paralysed.

Case 12.—A. R—, female, æt. 26, admitted January 22nd, 1856. Complexion florid, has lived in London last twelve years. Subject to rheumatism last nine years, suffers from it every winter. Had rheumatic fever nine years ago, has had palpitation more or less ever since, but not to such an extent as to cause her alarm till three months ago. Action of heart very tumultuous, complains of constant pain in the region of heart of dull wearing character, increased when palpitation comes on, which it does several times a day, especially on the slightest exertion. Has pain in knees, increased at night, a little dry cough in the morning. Thyroid gland enlarged equably, it first enlarged six years ago, is now less than it has been. Evident proptosis. Pulse very small. Breathing natural. Bowels costive. February 11th.—Heart beating with considerable violence, extended dulness over præcordial region, more especially at right side. Complains still of pain, gets but little sleep. A blowing sound is heard all over the heart, but a distinct rough systolic bruit is heard in the second intercostal space immediately to the left of the sternum; a thrill is also felt here. Same bruit is heard over right carotid. To the right of sternum both aortic sounds are heard clear. Health greatly improved. 22nd.—Pain very severe last night, and palpitation increased, no sleep. March 4th.—Pain not nearly so severe, and referred entirely to one spot near the apex of the heart. Pulse 112. Tongue clean. Less proptosis, gôitre decreasing. March 12th.—A severe attack of pain and palpitation last night relieved by empl. bellad. c̄. opio. March 18th.—Much improved. 19th.—About middle of day became worse with increase of pain and severe vomiting, the latter was allayed by hydrocyanic acid and digitalis in effervescing salines, but the pain continued very severe till 8 p.m., when eight leeches were applied to the præcordia; she expressed herself as much relieved, but died the following morning at 7.30. She was leeched over the heart on January 25th with relief, and blistered about the same part on February 9th, 22nd, and March 1st, with some advantage. She took small doses of tr. digitalis, spt. ammon. fœtid., salvolatile, and tr. ferri ammon. Her pulse was generally about 120. *Post-mortem.*—Bronchial and cervical lymphatic glands enlarged, supra renal capsules, liver, spleen, kidneys healthy. No pericarditis. Heart of normal size, its valves effective, some vegetations on the mitral, its muscular tissue of good colour. Both lungs in a state of pneumonic engorgement, the left at posterior part grayly hepatised. Thymus gland very large, weighed 1,200 grains; it overlapped the pericardium, lay upon the aorta and pulmonary artery, and reached down to root of left lung. Thyroid gland much enlarged. Brain healthy.

The symptoms in this case indicate the existence of a primary neurosis of the vagi nerves of a paralytic kind. The phenomena bear considerable resemblance to those produced by division of these nerves. The excited quick action of the heart is a constant result of this operation, and after death the lungs are often found more or less engorged and condensed. The attack of pneumonia which so suddenly supervened, and so rapidly proved fatal, was probably the result of some casual catarrhal (influenzal) agency affecting a system highly predisposed to pulmonary congestion and consequent effusion. Budd[1] and Gull[2] have both noticed the occurrence of low or gangrenous pneumonia from the compression of the pulmonary nerves by tumours of various kinds. The slight anatomical change found in the mitral valve is quite insufficient to explain the pain and palpitation which so frequently recurred. It seems impossible to regard them as other than functional disorders, especially as they varied so much. How far they were dependent on injurious pressure exercised on the vagi nerves by the enlarged glands must remain uncertain, though my belief is that no such pressure existed. I have certainly seen cases with very much greater glandular enlargement where no such symptoms were present. The thyroid enlargement and the proptosis are less easy to account for satisfactorily; but the common occurrence of gôitre as the result of malaria indicates its dependence on vaso-motor nerve paralysis and consequent hyperæmia, and the same conditions were probably concerned in inducing the proptosis. Thus, if we suppose hyperæmia of the tissues contained in the orbital cavity to issue in serous effusion, which is no very unlikely event, the globes would be protruded. It is abundantly clear from the preceding cases that an affection of nerves supplying vital organs may be a very serious thing, and that the prognosis should in such cases be guarded.

The expression "epilepsy of the heart" has been occasionally employed by physicians in reference to certain seizures. In the following record there is much, I think, which is very indicative of Epilepsy, or, at any rate, of affinity to that malady.

Case 13.—Mrs. D—, æt. 40, seen November 27th, 1866, rather anæmic, catam. regular; appetite very bad; bowels right; pulse natural, regular; heart's action, I believe, was normal, though I have omitted to mention this point in my notes. No apparent dyspepsia. Teeth decayed, formerly used to ache. Had once tic douloureux some years ago, and has been liable to pains at vertex of head since; these pains last a day or so. She has had "spasms," pain of severe kind, paroxysmal, at her heart for years. The last 3 months she had suffered with syncopic attacks, the first ensued without any known cause. In these something seems to fly from her heart to the back between the shoulders, and from thence up to the top of her head; it occurs like a stroke of lightning. She does not become unconscious, but instantly loses all power, and would fall if she did not let herself down. Her face and hands turn very pale in the attacks. The attack lasts only a few minutes, but the effects persist for days, making her feel very weak; the last attack was 3 weeks ago, and she has not recovered yet. Sometimes she has very slight attacks, which only make her feel poorly for one hour or so. There is no cry, nor any pain in the left arm during the attacks. She has noticed as premonitory signs pulsation ("live blood") all over her, and insomnia. Generally she sleeps well. I prescribed saccharated carbonate of iron, and a mixture containing Ammonia, Valerian, and Spt. Ammon. fœtid., as also henbane at night. She improved a good deal, aided, perhaps also by a visit to London, as change had done her good once before. Three days after her return home she found, on waking in the morning, that she must have had one of her attacks in the night, as she felt the same sensation in the head which she had had on former occasions, but she was less weak and prostrate.

---

[1] 'Med. Chir. Trans.,' 1859, vol. xlii, p. 215.

[2] 'Guy's Hosp. Reports,' 1859, p. 307.

The suddenness and apparent causelessness of the seizures, their aura-like commencement, the subsequent prolonged prostration, the occasional occurrence of the attacks at night, and of minor paroxysms, the existence of prodomata, are features very suggestive of Epilepsy. I ought rather to say of partial or incomplete Epilepsy, for the absence of unconsciousness and of convulsion are considerable points of difference. The patient had previously suffered from a cardiac or precordial neuralgia, which may have been an earlier stage of the more developed affection. The disorder was not angina pectoris, though it had some affinity with it, but was more akin to syncope. Trousseau's experience led him to regard angina pectoris, in many instances, as an expression of epilepsy, "une maniere d'etre" of its vertiginous form, in short, an epileptiform neuralgia. This view seems to me very applicable to the present case.

Kaulich ('Schmidt's Jahr.,' vol. cxxiii, p. 298) relates the following case, which belongs, I think, to the same category as the preceding.

Case 14.—W. J—, æt. 49, was attacked 3 weeks before he was seen by syncope, which recurred frequently, even several times a day. When examined his nutrition was perfect, his intellect normal; there was no derangement of sensation, or any other malady; only the heart contracted no more than 24 times per minute, and that irregularly. A short series of quicker and weaker contractions followed slower ones, the pulse corresponding to the former. The heart's sounds were dull, short, and limited, a weak, blowing murmur was heard over the left ventricle between the first and second sounds. At times the syncope came on spontaneously, preceded by a sensation of heat rising upwards from the epigastrium, and continued 1 minute with cadaverous pallor, loss of consciousness, twitchings of the facial and cervical muscles, and here and there of those of the extremities. The respiration during this time was 12 to 16, the heart contracted 16 times a minute, quite irregularly, increasing its rate after the attack was over to 60, but soon subsiding again to 28 or 32, Surprising improvement was produced in this case by oxide of zinc. The good health, the absence of apparent cause, the frequent recurrences, the aura-like commencement of the seizures, the convulsions, and the successful remedy, are all in favour of the view that the malady was allied to epilepsy.

Inhibitory paralysis of the heart, more or less complete, is another common form of neurosis. Its causes are very numerous. Strong emotion, even joyful, is one, as when Laodamia longs for the time when "languida lætitiâ solvar ab ipsa meâ;" terror, paling the cheek, is probably a more frequent. Somatic causes are traumatic, injury inducing collapse, as on the battle-field; the passage of a catheter even by skilful hands over an intolerant urethra; a deluge of cold drink upon an exhausted stomach; irritation of the nerves of the abdominal viscera, as in severe colic, peritonitis, the passage of biliary calculi; lumps of indigested food lying in a stomach impotent to digest them, as in "syncope senilis," and verminous accumulations, as exemplified by the following history. A girl, æt. 11, died in extreme asthenia after an illness of only 4 or 5 days. A tumour had been detected in the right iliac region of the size of an orange, and extremely sensitive, but both the tumour and the tenderness shortly disappeared. At the autopsy no fewer than 365 ascarides lumbricoides were found in the intestine, all but a few being in the small. The symptoms were an unnatural coldness of every part of the surface uncovered by clothing, and of the extremities, yet without any feeling of coldness on her part, extreme thirst, vomiting, a rapid and exceedingly feeble, thready pulse, rendered imperceptible by the slightest pressure. Two days later the coldness of the surface persisted even while she was in a heated room and wrapped up in warm blankets. Yet she scarcely appeared at all ill, made no complaint of pain, weariness, or debility, was buoyant, and cheerful in spirits. The day before her death, though almost pulseless, she walked from her chamber to the room below. Here, as in cholera, we have inhibitory intestinal irritation concentrating its deadly action on the heart's centres, but leaving the cerebral uninjured. (v. Cox in 'Edin. Med. Journ.,' 1859, August, p. 168.) In all these instances the *morbid* stimulus being reflected through the centres on to the cardiac nerves, arrests the play of the organ. A good illustration of this is afforded by Goltz's experiment. He found that in certain water frogs he could temporarily stop the heart by quickly tapping the abdomen, as with a rapidly revolving spatula. The stoppage was diastolic, precisely like that produced by irritation of the vagi; it could be prevented by destroying the central origin of the vagi, or by tying both of them. That the effect was not due to direct shock was proved by its not occurring if the tapping was applied to the head or spine; it was produced with extreme readiness by tapping the exposed stomach or bowels. (v. Syd. Soc. 'Year Book,' 1863, p. 19.) This experiment shows that a certain condition of a peripheral surface is essential to the result, and that the vagi are the channel through which the inhibiting influence, after it leaves the spinal cord, arrives at the heart. A contracted state of the heart is sometimes found after death has occurred in this way, but is no disproof of the muscular tissue having been paralysed during life. When the autopsy is not made until many hours after death, the cavities close in rigor mortis, the inhibitory influence having, of course, ceased to act. How different the appearance may be within 1 hour after death, and much later, is shown by a statement of Dr. Parkes in his work on cholera at p. 119, where he says, "In other cases the cavities are flaccid immediately after death, and contraction of the left side occurs afterwards."

Mr. Higginbottom has recorded[1] some well-marked examples of "syncope senilis" resulting from lumps of undigested food, and relieved speedily by the administration of an ipecacuan emetic.

The principles of treatment of all such cases are (1) to remove the cause if it be still acting; (2) if its removal is impossible, or the effects, as often happens, persist after the cause has ceased to operate, to counteract them by sedatives or beneficial stimulants. Sir T. Watson recommends warmth to the epigastrium, and laudanum in free doses when life is in jeopardy from drinking cold water while heated.

---

[1] 'Lancet,' April 20th, 1856.

Remak (v. 'Berlin Klin. Wochenschr.,' 1865) says that he has often observed the occurrence of a peculiar neurosis of the heart in connection with disease of the last molar tooth of the lower jaw. The mouth is closed partly by muscular spasm, partly by swelling. After a time the pulse is greatly accelerated, and the heart beats strongly; there is much præcordial distress. Remak believes that these cardiac symptoms are due to irritation conveyed from the diseased tooth to the superior cervical ganglia of the sympathetic. The constant current was applied to the angle of the jaw, and the rapidity of pulse, and, at a later date, the contraction of the jaw muscles, yielded to this treatment. In these instances we have reflected irritation rather than paralysis, the morbid stimulus taking its course, perhaps, rather through the sympathetic nerves of the heart than through the vagi.

Toxic neuroses of the heart are occasionally produced by drugs such as aconite and digitalis, or, as already noticed, by tobacco, but these we need not further advert to. *Gout,* according to Dr. Gairdner, very commonly causes more or less disorder of the heart's action. The first sign of disturbed health is impaired power of the organ manifesting itself by palpitation, fluttering, pause in its action, intermission, or some indication of diminished tone and energy. He refers to the case of a gentleman, æt. 50, who, after a severe attack of influenza, was affected with irregularity of circulation and faintness to such an extent as to give rise to the most anxious apprehensions. The mere rising from his seat, or having his bowels relieved, brought on a feeling of pause and failure at the heart, which lasted sometimes an hour, but he always had a steady, regular pulse, and was free from every kind of faintness or other emotion when perspiring under exertion. Dr. Abercrombie and Dr. Gairdner both regarded the case as one of suppressed gout, and their opinion was subsequently verified by the immediate removal of all suffering at the heart after it had recurred in a very mitigated degree by a fit of regular gout.

Tea is so notorious a disturber of the heart's tranquillity that there scarcely needs a warning against it. I am satisfied that it is not solely an idiosyncracy which renders it, even in moderate quantities, a very poison to some individuals, but that acquired nervous debility may have the same effect. The gentleman whose case I have alluded to at p. 353 used to take tea freely and enjoy it until the last 10 or 11 years without experiencing any ill effects. Now it renders him sleepless, hyperæsthetic, weak, and produces a sensation of præcordial uneasiness, and of failing action of the heart. Coffee, continued a few days, has the same effect, but not cocoa. It is illustrative of the change wrought in the nervous system by the toils and cares of life, as well as "labentibus annis," that the same man to whom tea is now a poison drank it instinctively as the most reviving beverage 24 years ago towards the close of an 80 miles rowing match. It is plain enough that to a tolerably firm nervous system tea (in moderation) is a grateful and useful stimulant. Its poisonous action on the weak and impressible system is to be explained, I believe, much in the same way as that of alcohol or opium, or many like agents. Nerve tissue of a certain tone, or stamina, or steadiness, or whatever else we may please to call the unknown faculty which determines the degree of excitability, will bear and have its functional energy increased by a given amount of a particular stimulus. Increase the amount of the latter, or decrease the amount of the former, and the result is the same—the nervous tissue is thrown into disorder. The same dose of wine or tea that benefits a strong brain or strong heart will prove injurious to a weak excitable brain or heart. This is a general law, and I do not know that we can refer it to any higher.

Dr. Stokes relates some very interesting instances of the effect of excessive tea drinking in persons who, it may be presumed, could have taken moderate quantities well enough. The symptoms were a feeble, irregular, intermitting pulse, a tendency to delirium, acute pain, distress, and oppression at the precordia, a painful sense of impending death. In one case the heart sometimes palpitated, at others seemed motionless; in another there were paroxysms of quick and vehement action. The respiration was irregular and oppressed, or hurried and laborious. A very curious symptom in one case was an inability to walk with any sense of security on a smooth, flat surface, so that he has been known to proceed along a level flagway on all fours. On rough or uneven ground he had never the least difficulty. He was quite comfortable on the deck of a yacht in a gale of wind. His frame was strong; he had travelled much, and was no *malade imaginaire*.

A common form of cardiac neurosis is that where the action of the heart is much accelerated, ranging from 110 to 140 in the minute, in the standing position, and not falling much below the former figure in the sitting. The contractions are abnormally sharp and vivid, the organ seems to spring up with a quick forcible leap against the ribs. The apparent excess of action misleads the practitioner sometimes to suppose that there is hypertrophy. Percussion, however, shows that no enlargement exists, and auscultation detects no vascular bruits, nor derangement of the rhythm. The feeble stroke of the radial pulse often contrasts markedly with the vivid action of the heart. The general condition of the patient exhibits more or less evident indications of debility. Dyspepsia is often present to some extent, but is by no means always the essential cause. Tea, on the other hand, seems in most cases really to be the "fons et origo mali," the symptoms subsiding materially on its omission. I think the pathological condition in such cases is essentially hyperæsthesia either of the nervous centres or of the sensory nerves of the heart, perhaps especially of those fibres distributed to the endocardium of the ventricles. The hyperæsthesia is, as in other instances, the result and associate of debility. The feebleness of the pulse shows how ineffectual the apparently forcible contractions of the heart are. In fact the ventricles do but grasp the blood for a moment, and relax again immediately before they have fully emptied themselves.

Very much allied to the preceding is "the curious cardiac malady" so frequent among soldiers, which Dr. Da Costa describes (v. 'Med. Diag.'). "Its main symptoms are habitual frequency of the action of the heart, constantly recurring attacks of palpitation, and pain referred to the lower portion of the præcordial region. The palpitations occur chiefly during exercise, but may also take place when the patient is quiet, and in many cases are most frequent, or indeed happen entirely at night, thus interfering with sleep. It is not unusual to hear soldiers that are subject to the disorder complain much of headache and dizziness, and especially of being thus affected when suffering from palpitation. The pain is generally dull and constant, but is often also described as shooting, and as taking place only in paroxysms. Its chief seat is near the apex, and it is combined very commonly with excessive cutaneous sensibility. Often there is pain nowhere else in the body, but in some instances the cardiac distress is associated with pain in the back, which itself is not unusually connected with the excretion of oxalate of lime by the kidneys. The action of the heart is very rapid, and in many instances its rhythm is irregular. The impulse is slightly extended, but is not forcible like that of hypertrophy; it is rather abrupt and jerky." The first sound as a rule is short, sometimes sharp, like that of the second, at other times extremely deficient and hardly recognisable; the second sound is intensified. We hear no murmurs either in the heart or in the neck. The pulse is almost always easily compressible and is generally much influenced by position, falling rapidly 20 beats or more when the erect is changed for the recumbent posture. The respiration is not correspondingly accelerated; often with a pulse of 100 its rate does not exceed 20 per minute. The disorder is a very obstinate one to manage, and improvement comes but slowly. Keeping the heart quiet by occasional doses of digitaline, or by atropia, and improving its tone as much as possible by tonics, among which iron is serviceable, has been the most successful treatment. "What is the cause of the morbid cardiac impressibility it is very difficult to ascertain. It seems in many instances to have followed fatiguing marches; in some it occurred after fevers or diarrhœa." It does not seem to have been connected with scurvy, the abuse of tobacco, or to have depended on anæmia. It seems to me very probable that over exertion without previous training, was the cause of the symptoms in these cases. The cardiac nerve-centres becoming exhausted, became feeble and hyperæsthetic and continued so. I have some personal experience of this occurrence. When about 21 I made a long mountain excursion which, as I was out of condition, fatigued me extremely. I felt ill and sleepless the following night, and some days later was attacked by severe præcordial distress, with sensation of impending death which harassed me for a considerable time. It is a most important rule not to attempt any severe labour without previous preparation.

Unusually rapid action of the heart is, of course, a common enough occurrence in low fever, pyrexial, and sundry nerve disorders, but it sometimes appears as the prominent phenomenon, which takes precedence of the others, and forms the distinctive feature of the disease. Seven cases of this kind have been related during the last 2 years in the 'Brit. Med. Jour.' The patients were mostly about mid-life, 1 was 66; 4 were males, 3 females. In all the disorder was *paroxysmal*, the attacks lasting from a few hours to 2 or 3 weeks. In 4 the attacks *terminated* abruptly and suddenly, the patients being able to tell the exact moment of their cessation. The symptoms *associated* with the special one were anxiety, general distress, irregular, hurried, wheezy or difficult breathing, sense of suffocation, lancinating pain at the heart, pain in the left side, and pain, numbness, or tingling in the arms, sense of dying, gastric derangement, insomnia, and in one case anasarca of the lower limbs, and enlargement of the liver. The pulse was in all but 1 case 200 or more up to 250, and very feeble; more than once too much so to be distinctly perceptible at the wrist. No definite *cause* in any case could be discovered. The relation of the disorder to others, and the temperature remain to be investigated. Treatment by stimulants with digitalis has been appropriate, but the disorder seems rather to have ceased of itself than to have been cured. The pathology is obscure. Dr. Cotton, who published the first of the 7 cases as well as the last, suggests that either the blood may be in an abnormal, irritating condition, or the heart unduly sensitive, but he admits his inability to understand how the sudden return of the heart to healthy action is to be accounted for. I think this very circumstance, as well as the paroxysmal character of the disorder, and the tenor of the associated symptoms goes a long way to show that it belongs to the neuroses. No other disorders are prone to terminate suddenly. This view is confirmed by experimental pathology, which shows that division of the vagi nerves accelerates very greatly the action of the heart. The same effect is produced very remarkably by a disease of the encephalon, which is very likely to affect the vagi, viz. acute hydrocephalus, in the latter stage of which the pulse may rise to 200. The associated symptoms point very decidedly to the implication of the vagi in the disorder; in 5 the breathing was notably affected, and in 2 the stomach was deranged. My notion is that the pathema is a paralytic neurosis of the vagi, or of their cardiac branches, essentially similar to a common neuralgia, *e. g.* sciatica. Whether it be primary, affecting the vagi directly, or secondary to some remote irritation is a question which should always be considered, and which may be answered differently in different instances. In Dr. Cotton's first case the patient had tapeworm.

The production of anasarca and hepatic enlargement by the paroxysm as in Sir. Thomas Watson's case is of great interest, as showing, I conceive, that the blood accumulated in the right, the weaker ventricle, and was not adequately expelled owing to imperfect contraction of its walls.

The theory I prefer approves of Dr. Cotton's treatment by ammonia, digitalis, and stimulants as highly rational, the aim being to rouse and restore the deficient nervous power of the vagi, or their centre in the medulla oblongata. It may, however, be added that this would not suffice supposing the paresis to be of reflex origin. The cause of remote irritation would then have to be removed.

Dr. Lyons[1] has recorded a remarkable case, which is as follows:—A male, between 30 and 40 years of age, began to suffer at first with debility and unpleasant sensation in the chest, after a time could not leave his room, and scarcely could stir without increasing the heart's action. During the periods of excitement of the heart's action the debility was extreme, the patient's sufferings most intense, and the cardiac action almost more violent and tumultuous than Lyons had ever before witnessed. The face was flushed vividly, the pulse was 120, regular, and not remarkable for force or volume. The impulse was very violent, and a loud diffuse, systolic bellows murmur was audible with great and equal intensity over the whole precordial region. Iron and tonics failed to give any relief, but vesication continued for ten months was of some service. After about five to seven years he completely recovered, and the most careful examination was unable to detect anything in the least degree morbid about the heart or any other part. Lyons considers this case to have been one of pure uncomplicated myocarditis. To me it appears more probable that it was an intense hyperæsthesial neurosis for these reasons. I cannot think that a myocarditis could exist for years without destroying life, or at least seriously damaging the tissue of the heart, or of its valves by extending to them. Moreover, an inflammation would so weaken the muscular fibres as to prevent the action of the organ from being excessive. Demme states that the most constant and manifest symptoms of myocarditis are decrease of the heart's energy, loss of rhythm in its movements, increasing frequency of the pulse, steady diminution of its size, and its continuous undulatory character (v. 'Schweiz. Ztschr. f. Heilk.,' i, pp. 79, 461, 1862). On the other hand, the extreme debility, the intense suffering, and especially the long continuance of the disorder are much in favour of its neurotic character.

The treatment of cardiac hyperæsthesia is too often unsatisfactory, probably because it is impossible to obtain rest for the organ. An irritable brain or stomach may be soothed by giving them timely repose, but we can do this but very partially with the heart. Avoidance of all emotion and excitement is very desirable, and the diet must be scrutinised to see whether some of its component articles may not produce or increase the hyperæsthesia. In severe cases occasional small leechings may be recommended. Belladonna plasters are generally useful, and I should expect benefit from hypodermic injection of opium into the precordia. Internally I have seen most benefit from tr. digitalis ♏xv *ter die*, but I am not altogether satisfied how far it is quite safe to give this drug in states of cardiac excitement. In conditions of cardiac languor I have no fear of it, but in the opposite I think we need to be cautious. In some cases aconite and hydrocyanic acid may be useful, but they have not served me well, and I know too much of the poisonous action of the former to not a few systems to make me otherwise than reluctant to use it. Alkalies, however, which in acute rheumatism reduce the frequency of the pulse sometimes so markedly, are perfectly safe, and might well be tried in cases where debility was not a prominent feature. Opium and nitrate of silver might be suitable remedies, especially where there was irritable dyspepsia. The very possible dependence of the disorder on some remote, perhaps little heeded irritation, should not be forgotten.

---

[1] 'Dublin Quar. Jour. of Med. Sc.,' May, 1862.

Sometimes, though much less frequently, we meet with a state where (organic disease being excluded as a cause) the existence of *anæsthesia* (comparative) of the cardiac nerves must be regarded as highly probable. The following case may be cited as an example:

Case 15.—A. H—, æt. 67, plumber, admitted November 19th, a strong-made man, markedly anæmic, of calm, steady manner, affected with ichthyosis, which he stated disappeared in summer when his skin was moist. He had been ailing 6 weeks, complaining of general lassitude, and a little momentary giddiness at times. Heart's apex beat is just outside the vertical line of the nipple, the dulness area is rather extended, slight epigastric tremor is visible, the sounds are indistinct, appear to consist of a weak first and two second sounds, with a long pause. Pulse 20 per minute. No arcus senilis. Good breathing in lungs. Says that he had pericarditis 30 or 40 years ago. Seems to have noticed the slowness of his pulse the last 3 or 4 months. He took ammonio-citrate of iron with spirit. ammon. Co. and calumba, with decided benefit, and the pulse became rather less slow, but did not exceed 32. About 6 months after I first saw him he was in much the same state, his lassitude perhaps increased, he felt very tired, and his right leg felt lame and half paralysed at night, with slight pain in his right arm; he had also lost his smell. After 3 weeks of iron and calumba he had lost his lassitude in evening, and felt altogether better and stronger. He never had any faintness.

It seems to me impossible to attribute the remarkable slowness of the pulse to organic disease in this instance. There was no sufficient evidence that any existed, except a little hypertrophy, and possibly an adherent pericardium. The circulation was efficiently carried on far more than in many persons whose pulse beats 3 or 4 times as fast. His nervous actions generally seemed to be of a quiet deliberate character, and it is very possible that his cardiac centres had this peculiarity in a still greater degree. He had no symptom of lead poisoning, but it is possible that his occupation may have induced a gouty diathesis, and that latent gout was the real cause of the slow pulse.

Dr. Peacock in an able paper on unusual slowness of the pulse (v. 'Med. Times and Gaz.,' January 2nd, 9th, 16th, 1864) concludes that the defect is evidently one of function. He grounds this belief on the facts that when the symptom is combined with decided disease of the heart, the structural changes are of very various characters, and that it is met with in cases where there is no reason to suppose that there is any structural defect. He considers that undue slowness of pulse must result either from a want of proper muscular irritability, or from defective innervation of the heart. In the rare cases where the pulse is slow during the fever period it seems most probable that the fever miasm acts on the vagi nerves in the same manner as full doses of quinine do. The condition of the blood probably affects the rate of the pulse in some cases, a slow pulse being not uncommon in the chlorotic and anæmic. When the pulse is slow during convalescence from acute febrile diseases the occurrence seems to me to be of the same nature as the excessive fall of temperature which is frequent about the same time. It seems as if the nerve tissue on the cause of fever ceasing to act passed by a kind of rebound into the opposite condition. The vagi and sympathetic nerves recovering from their paresis exert somewhat more than their usual power over the heart and vessels. A slow pulse is well known to occur in certain states of cerebral disease, and is probably dependent on intracranial irritation affecting the medulla oblongata near the origins of the vagi. It is plain from the above that the import of the symptom is not always the same. Before we decide whether the slowness depends on anæsthesia of the sensory nerves, or over action of the regulatory, we must take into consideration the circumstances under which it occurs.

CHAPTER XXXIX.

PULSATION OF THE ABDOMINAL AORTA.

This symptom is well known as a not unfrequent neurosis, but is, nevertheless, not unlikely to cause some perplexity to a not very experienced observer. Even the most sagacious are occasionally taken in by abdominal pulsation simulating aneurism. The subjects of this affection are generally neurolytic and hyperæsthetic, and the pulsation sometimes gives rise to much uneasiness. A diagnosis is generally to be made by having regard to the state of the patient's nervous system, the age and sex, his liability to dyspepsia, or intestinal irritation, the non-expansive character of the impulse, the mobility of the tumour, if there is any, the absence of wearing pain in the back, the alleviation of the symptom by rest, and its aggravation by fatigue, and especially by the curative effect of appropriate remedies. The existence of pyrexia in cases attended with irritation in some portion of the digestive tube is noted by Dr. Stokes as nearly conclusive against aneurism. He also states that in females the period immediately preceding the catamenia is very likely to give rise to such pulsation, as well as the early and middle periods of pregnancy. Another caution he gives is against mistaking an accidental increase of the throbbing of the abdominal aorta in permanent insufficiency of the aortic valves for aneurism. As to age, though aneurism is generally reckoned a disease of advanced life, it is to be observed that when affecting the abdominal aorta it may occur tolerably early. Two cases under my care, one verified by an autopsy, were 29 and 32 years old; Dr. Beatty's case was 33; Dr. Stokes says that from 25 to 40 is the period most liable. On the other hand in 3 cases of mere aortic pulsation the ages were 24, 51, and 62 years. The value of sex in diagnosis is no doubt greater than that of age, but it has not occurred to me that I remember to meet with a marked case of aortic pulsation in a female. Dyspepsia and similar intestinal disorder probably act as causes of reflex paralysis much in the same way as a frontal neuralgia may on the motor nerves of the eyes or lids. Though the expansive character of the impulse when well marked indicates aneurism, yet Dr. Walshe's observation should not be forgotten (v. p. 144, 'Dis. of Heart') showing how fallacious this symptom in certain cases may be. If a tumour exist which can be moved away from the source of pulsation there is, of course, no aneurism. The absence of pain in the back or other parts is a valuable negative sign of the functional disease. Too much stress must not be laid on the effects of repose and fatigue, as they would be similar in both diseases, but relief would be earlier and more decided in the functional. The action of remedies may be, of course, decisive, but in Dr. Walshe's experience a complete cure of even the less grave disorder is hard to be obtained. The existence of murmur, systolic or diastolic, of course of arterial origin, is no proof of aneurism. Dr. Walshe used to hold that the diastolic murmur in the course of the aorta was a sure sign of disease in its coats, but subsequent observation has shown him that such is not the case.

The causes of this disorder are very much the same as those of other neuroses, viz. *toxic* agents, such as tea, tobacco, &c., *neurolytic*, and *irritative* (remote).

The following is an average instance of the disorder in question:

CASE 1.—A. B—, æt. 51, admitted August 2nd, 1867. On admission he complained of pain and flatulent distension all over the abdomen, and "that all his food went bubbling about" in his interior. His tongue, pulse, appetite, and heart appeared normal. Bowels costive. Urine pale, sp. gr. 1010, and not albuminous. The abdomen pulsated visibly to the eye, and very forcibly to the hand, over a large extent of surface, almost down to the hypogastrium. Some who saw him regarded his case as one of aneurism. Ten days after admission he had an attack while at chapel, which began as a beating at the lower part of his abdomen, and went up to his throat and head; it made him feel fainty as if he should drop down, but he was not flatulent; he was led to his bed where he lay down and got better. On closer examination a week later pulsation was only seen under the left ribs close to and in the epigastrium, it seemed as if of cardiac production. Lower down pulsation was readily felt on firm pressure, and a bruit was audible in the upper third of the abdomen, a little below the left ribs, near the median line. No tumour could be discovered, no lateral expansion could be felt in the impulse. As he gained strength the pains which he had in his abdomen first disappeared, and afterwards those he had in his right leg. He went to the seaside and returned looking very well and able to work, but even on September 28th when he was last seen there was some abnormal pulsation at the upper abdomen. He took after the first 14 days a mixture consisting of Strychnia, Nitric acid, and Chloric Ether, to which was subsequently added Liq. ferri pernitras. This was evidently very beneficial. Cocoa was also ordered in place of tea, and 3 oz. of port wine given. The flatulence and indigestion, the quasi-syncope, the absence of tumour, and the improvement under remedies leave no doubt that this case was one of mere functional disorder.

LEEDS SCHOOL OF MEDICINE

CHAPTER XL.

RESPIRATORY NEUROSES.

The respiratory enjoy no exemption from the disorders which are apt to befall other nerves. Some of their neuroses have long been accepted as classic diseases. These we will notice after we have considered some of the less definite pathemata which, however, sometimes constitute remarkable and puzzling symptoms in the course of special diseases.

We will take, first, a condition characterised by great dyspnœa without apparent cause, and in which the hurried breathing seems to depend much more on nerve disorder than on any impediment to the aeration of the blood. Trousseau refers to such dyspnœa as a striking nervous phenomenon, and one of bad omen, which occurs in various grave maladies of septic character. He gives the post-mortem examination of a case of scarlatina in a puerperal female, where this symptom was well-marked, in which the brain, heart, and great vessels were found quite healthy, and the lungs presented only a little congestion. The patient had been highly delirious. Graves noticed the same kind of disproportionate dyspnœa in cases of influenza. One patient, a female, presented nothing more than a few sonorous râles in the course of the larger bronchi, every part of the lungs was permeable, yet she suffered considerable dyspnœa, and the respiration amounted to 46 in a minute. Another, a man of Herculean form, in the prime of life, suffered intensely from dyspnœa, his chest heaved, he tossed about in bed in a constant state of agitation and restlessness, and yet the respiratory murmur was everywhere distinct, and no râle could be heard except here and there a few bronchitic wheezings. He also laboured under insomnia, and, though he had but little fever, his debility was extreme. He recovered with extensive blistering, stimulants, and narcotics. Graves further notices the intermittent character of the dyspnœa in many bad cases of influenza, and attributes the respiratory derangement to the cause of the malady, the miasm, and not to pulmonary inflammation.

Dr. West notices nervous dyspnœa in young children as liable to occur in the course of bronchitis, and very likely to be aggravated by lowering treatment, the respiration growing more and more frequent until the child dies in convulsions. I have related (v. p. 314) the history of a patient dying in coma after an epileptic fit, in whom the respiration was very rapid shortly before death; and the same was the case in a man dying comatose after an operation on the urethra, whose history I have related in my 'Lumleian Lect.' (v. 'Med. Times and Gaz.,' 1866). In all these cases I observe the concurrence of two phenomena, viz., rapid breathing and nervous prostration, and I believe the two are causatively related to each other. The nervous prostration conditionates, as it so commonly does, hyperæsthesia of the nervous centres, in this instance of the respiratory, and hence it follows that the breathing movements are hurried. I believe the same is the cause of the rapid panting respiration of an untrained man who has run himself out of breath. It is usually ascribed to accelerated circulation, which creates a necessity for more frequent aeration of the blood; but I cannot think this is the real cause, while I so commonly see pyrexial patients with a pulse quite as rapid as that of a man who has used much exertion, yet without any hurry or labour of their breathing. Neither is it at all uncommon to see patients whose aerating surface is greatly diminished without their respiration being materially quickened. Anæmic patients, also, when they have after recovery perhaps doubled their amount of red cells, can exert themselves with much less breathlessness than when they were pale and weak. Malcolm could "right up Ben Lomond press, and not a sob his toil confess," but an average English youth would hardly do the same without special training. All these facts go far to prove that the amount of blood passing through the lungs is not the chief factor of hurried respiration. In most persons there is quite sufficient reserve space in the lungs to allow of much more considerable aeration being effected than takes place under ordinary circumstances.

The following case is probably an instance of the same condition in modified form.

CASE 1.—Miss ——, æt. 20, seen May 3rd. Has been ill about 2½ years, since an elder sister had a severe illness, which caused her much anxiety and alarm. She is now constantly suffering distress with her breathing, she seems unable to draw it quietly, but catches it in a hurried panting manner 3 or 4 times, and then pauses, but begins again the same panting in a minute or so. Sometimes the inspiration is more like yawning. At night the breathing is quiet when she is asleep, but she is often a long time before she can get to sleep, and has to remain sitting up on the side of her bed. At times she has a vast extrication of flatus from the stomach; this is promoted by stimulants and used to relieve her, but does not now. She has a great craving for brandy and water to relieve her sense of exhaustion and her respiratory distress. The heart's action is very much excited, the sounds are loud and free from murmur. Respiratory murmur is normal in all parts of the chest. Her hands and feet are numb and tingling, and her legs are very weak, so that she feels insecure in walking. Hands are damp generally. Tongue red at edges, middle part of dorsum covered over with long irregular whity fur. Catamenia regular, but scanty, with a good deal of "whites." Bowels costive. Throat normal. Several bad teeth in jaws, no wisdom tooth discoverable in either. No cough. She used to be a good pianist, but now cannot endure music or any noise. Five years ago, when at school, had her jaws set fast for a time. A dental surgeon who was consulted did not think that the teeth had anything to do with the disorder. An inquiry was made as to the presence of worms by means of a draught of Ol. Tereb. + Ol. Ricini, but the reply was negative. Some jerking of the left shoulder occurred at times. The chief remedies employed were Bromide of Potassium in gr. x—xv doses *ter die*, and a pill of Arg. Nitrat. gr. $\frac{1}{2}$ + Morph. Acet. gr. $\frac{1}{6}$ + Extr. Cannab. Indic. gr. $\frac{1}{3}$ in pil. *ter die.* A shower-bath was also advised. Considerable improvement was obtained with some variations for the worse at times. My last note, August 7th, states that she still suffers with the respiratory sighing, but to a much less extent, and mostly in the evening; she has good nights and very little flatulence. A wisdom tooth was showing itself in the right upper jaw. The aspect of this case was very suggestive of the existence of remote irritation, but I could detect none, though I am not satisfied that my suspicion of the teeth being to blame was unfounded. The sedatives gave much relief, and showed that the condition was one of hyperæsthesia. Larger doses of Bromide, however, should have been given.

There are other conditions in which the nerve disorder is evidently of hyperæsthetic character, but seems to be situated in the more peripheral tracts. It is not uncommon (with me at least) for a common nasal catarrh to terminate with a most troublesome dry cough, coming on at night, and appearing to depend on a sensation like pruritus of the pharyngeal mucous lining. It is calmed by Indian hemp. Some tracheal and bronchial coughs are of the same kind, though more permanent. They are generally associated with debility, and are benefited by tonics and sedatives. The following are examples.

Case 2.—E. C—, female, æt. 52, admitted January 29th. Ill eight months with severe catarrh and cough, pains between shoulders, dyspnœa, anorexia. The cough is very violent, but dry. No râles heard on auscultating the chest. Is very weak. Atropiæ gr. $\frac{1}{120}$ + tr. ferri mur. ♏ xv + oxym. scill. ♏ xv + aq. ℥j *ter die.* February 12th.—Cough very much better. Strychnia with tr. ferri mur. was now given, and the atropia omitted. 19th.—Wonderful appetite from this medicine, but it does not quiet cough like the other. Pt. addendo atropiæ gr. $\frac{1}{120}$ ad. sing. dos. The cough was soon relieved, and she was discharged March 12th.

Case 3.—W. M—, male, æt. 59, admitted April 12th. Ill all the winter with cough, but not enough to lay him up; worse last six days. Gets weaker and weaker, can't work now. His breath fails on exertion. Much thick expectoration. No râles in back; breathing obstructed in right front, fairly good in left. No sleep at night from cough. When he has an attack of cough it affects his head so that he falls off the chair, and becomes insensible for a minute;—this often occurs at the instant the cough comes on. Appetite very bad. Vomits up his food at times. Pulse large, soft. Skin cool. Bowels open. Lungs rather emphysematous. During the treatment he experienced, for a time, a sensation in his head as if he were half stunned, making him feel stupid; this was relieved by putting his feet in hot water. His treatment consisted of strychnia, nitric acid, and opium, with morphia and stramonium at night, subsequently of quinine and arsenic. He benefited very decidedly, and was cured in less than a month.

Case 4.—D. P—, female, æt. 42, admitted December 17th. Of short, broad make. Ill two or three weeks with a dreadful screaming cough, which causes much trembling and exhaustion, and lasts for four or five hours at once. The cough strains her chest so that she fears that some extensive cicatrices on the chest from erysipelas, which she had last year, will give way. No insensibility ever induced by cough. Pulse of good force. Tongue clean. Urine copious, thick. No appetite. Always very weak since her illness. She was ordered acid. nitrici ♏iij + atropiæ gr. $\frac{1}{120}$ + aq. ℥j *quater die.* This was taken up to January 18th, the doses being increased in number up to seven or eight a day. It produced very considerable improvement both in the cough and expectoration, and was then changed for quinine + iron + liq. opii sed. ♏vij *quater die,* with which she improved still further, and the cough completely ceased.

Case 5.—G. F—, male, æt. 28, seen November 15th. Ill one month; never suffered in same way before. Of very stout plethoric habit. Pulse 100, soft, large, not notably weak. Heart's sounds normal. Urine lateritious. Suffers from a severe cough, paroxysmal and suffocatory, attended with substernal pain; it occurs in a succession of expiratory acts like the cough of pertussis. Cannot lie down at night. Is easy sitting in a warm room; suffers much more on exposure to cold. No râles in chest. His mother states that he never had hooping cough, and it is prevalent in the vicinity. There is a good deal of blood in the mucous expectoration. With nitric acid, strychnia, quinine and opium *ter die*, and stramonium and morphia at night he improved rapidly, and in a week was convalescent.

Remarks.—These cases are examples of a not uncommon pulmonary neurosis, in which, together with marked general debility, and more or less local vascular congestion, depending on vaso-motor paresis, there exists predominating hyperæsthesia of the nerves of the air-passages. When the hyperæsthesia is considerable, and there is but little catarrhal affection, atropine has approved itself a very valuable remedy. If there were much vascular congestion I should prefer opium. Where the debility is great, strychnia and iron, aided usually by the sedatives, should be employed: they seem by imparting tone to lessen the undue excitability of the nervous structure. The peculiar attacks of insensibility which occurred in Case 3, were not, I believe, at all dependent on congestion of the brain, but rather on disturbances of its nerve force, such as I suppose to occur in the "petit mal" of epilepsy. They ceased under the tonic treatment together with the cough. I look upon them as analogous to the cerebral disorder which a gastralgic patient, recently under my care, complained of. He stated that the pain made him lightheaded at times; he felt as if his senses were going away. He was cured by strychnia, iron, and opium. In this case there could be no question of any cerebral congestion. In a patient under my care with pretty severe bronchitis attacks of insensibility sometimes occur when he has coughed less than half a minute, so complete that he has fallen down and hurt his face, while at other times he coughs for a long while without losing consciousness. This would scarcely be the case if the insensibility depended on cerebral congestion, which would increase with the duration of the cough.

Certain so-called hysterical coughs may be fitly noticed here. Their general characters are continuousness, monotonous repetition, non-dependence on bronchial or tracheal inflammation or other lesion, dryness, and obstinacy. Sir Thomas Watson verily believes that some of these coughs are more annoying to hear than to suffer. Trousseau, however, states that when the disorder is much prolonged it tells injuriously on the general health. This is especially the case when the cough is complicated with obstinate vomiting. Though it is the rule that this tussive neurosis remains unchanged in form, it sometimes alternates with convulsive or paralytic seizures, or with vomiting or sneezing. The following case related by Trousseau is a good example of this kind of disorder, and of the remedy which is in many instances most efficacious. I may, however, mention that Indian hemp and Strychnia are well worth trial in cases where change cannot be readily had.

Case 6.—A young lady, æt. 17, delicate-looking but having unusually good health, whose mother was subject to twitching of the face, whose catamenia were regular, and who had never had nervous attacks, though presenting all the features of the hysterical constitution, began to cough in May, 1852. The cough was at first trifling, but afterwards became so frequent that her friends became uneasy. She coughed without ceasing almost the whole day, but was free whenever she was asleep whether by night or day. The cough was dry, sharp, noisy, shrill; was audible at a very considerable distance, and recurred with an almost unvarying rhythm. The respiration was normal, the throat neither red nor painful, the voice unaffected. Baths, cold affusions, and the most different medicines were of no avail. The patient remained in the same state till the beginning of July, when she became feverish, her digestion was deranged, her appetite lost, and the food she took at dinner was vomited in about half an hour. Trousseau considered her general state so unsatisfactory that he sent her off directly to the south. Almost as soon as she reached Orleans the vomiting ceased, and the fever, the cough disappeared the next day, and the patient was well and has remained so.

Messrs. Griffin also insist on the importance of change of air. in similar cases.

Anæsthesia of the respiratory nerves is common in coma from poisoning, and from various intracranial diseases. The centres are then affected, probably more than the peripheral tracts. As a mere neurosis respiratory anæsthesia is rare. I have not specially noticed it, but it has not escaped the observation of Dr. Walshe. He says that a condition is sometimes met with where the respirations are rhythmically infrequent, not more perhaps than 6 a minute. "The sounds are exaggerated, but of good quality. The normal subjective sense of the necessity of breathing seems deficient" (v. p. 318). He also notices the singular infrequency of breathing in chorea. There can be no doubt of the value of these observations. It has, however, often occurred to me that we need more than numerical statements of the frequency of the respirations, for if, as often happens, the inspirations are weak and shallow, a large number may be only equivalent in aërating efficacy to a much smaller of stronger and deeper. There may be no real anæsthesia in the slow breathing, the nerve is as strongly excited in a given time as in quick breathing, and acts on the centre as effectually, but it is charged and discharged more slowly. Perhaps respiratory anæsthesia may be the cause of the absence of distress in such cases as that recorded by Dr. Stokes. He tells of a patient dying of phthisis, who, "during one night and part of the next day, remained in a state of dreadful orthopnœa, while the stridulous respirations were so marked and prolonged that the patient might be described as breathing through a pinhole. While supporting him in bed I said, 'M—, I grieve to see you in such suffering.' He replied in the lowest whisper, 'I have no suffering, I never was more free from suffering.' Yet each inspiration was prolonged to at least 10 times its usual duration. I said, 'But your breathing is so difficult.' He pressed my hand, saying, 'Thank God, I never was breathing better'" (p. 586). Sir C. Bell records the case of a surgeon who had suffered from a malignant fever with erysipelas, and large dosing with calomel. After this, perhaps in consequence of it, he fell into the following condition, which has been observed by medical friends who have watched him. When sleep is overpowering him the breathing becomes slower and weaker, the heart and pulse also fall low and cease to beat as sleep comes on, and after a short time he awakes in terror, convulsed, and with a sensation of death (v. p. 426). The reading of this case seems to be that the nerve-force of the medulla oblongata had become so impaired that it was no longer able to work continuously as it naturally should, but fell into torpor when the hemispheres took their repose. The case illustrates also the tendency of a certain state to spread from one nerve-centre to another.

The treatment of respiratory anæsthesia must be chiefly directed to tone and stimulate the languid nerve apparatus. The usual tonics and stimulants, phosphorus, tea, coffee, and alcohol may all do good service. The following instance of the good effects of tea in coma induced by alcohol is worth mention. An infant, 18 months old, had taken 3 parts of a wineglassful of bad whisky, and shortly after became comatose. When seen 1½ hour after the dose her face was pinched and drawn, her extremities very cold, her pupils were dilated, and death apparently at hand. She recovered after 6 teaspoonfuls of strong tea.

Paresis of the respiratory nerves and centres is prone to occur under manifold circumstances of debility. It constitutes the cause of the cerebral respiration, or sighing, occasionally observed in fevers, and other states of nervous prostration, when the involuntary centres are incapable of supplying the necessary motor impulses to the muscles without the aid of the voluntary. A good instance of this was communicated to me by Dr. Tyler Smith. A lady who had a tumour in her uterus suffered from menorrhagia, and her respiratory power was so weakened that she had to supplement the reflex action by voluntary; and this necessity woke her up from sleep if she dropped off. Others of his patients are unable to sleep during the catamenial period. The following similar instances have occurred to me:

Case 7.—M. T—, female, æt. 27, admitted October 13th. Ill six days. Complains that she can't get her breath, can't sleep at all soundly for dyspnœa at night. Her chest is not tight, she has no cough, air enters freely into lungs; sounds of heart normal. Pulse good. Has cold perspirations frequently. Menorrhagia exists to some extent, the catamenial flow lasts seven to fourteen days. Feels faint and giddy. Takes food fairly well. With ferri carb. saccharata, ammon. carb. and tr. arnicæ and liq. pot. arsen. she improved materially during the six weeks she attended; the last time I saw her "her breath was nothing near so bad."

Case 8.—Master H—, æt. 9, seen December 9th. A fair-haired, intellectual-looking, lively boy. Ill for more than a year. Is decidedly feverish, and is thirsty at night, not by day. Is frequently sighing, about once a minute or oftener; this "besoin," he says, keeps him awake at night. The lungs and heart are quite healthy. He has pain also in the abdomen about the upper and mid-part, not increased by pressure. Appetite bad. Tongue clean. Skin cool. Pulse weak. With quinine + iron he recovered completely.

Aphonia not materially differing from that often termed hysterical is met with occasionally under circumstances which preclude entirely any suspicion of volitional defect. The following is an example:

Case 9.—G. H—, æt. 30 (about), a carpenter, applied to Dr. Palmer one evening, attended by a companion. He was in perfect possession of his intellectual faculties, understood all questions, but was utterly unable to utter a word in reply, though he could produce some indefinite sounds. He could put out his tongue, move his lips, and all his limbs, and pointed to his mouth as the seat of defective power. He felt giddy, and rather faint, and was fatigued by his day's toil. Dr. Palmer ordered him ammonia and other stimulants, and desired him to take a good quantity of porter, and get to bed as soon as he could. He followed these directions, took 5 pints of porter, got "jolly tight," as he described it, and went to sleep. The next morning he awoke at 4 a.m., and found that his power of voice was completely restored. He has remained quite well for some months, but has lately had an attack of catarrh, in which his voice became whispering and hoarse, and he stammered a good deal, which is quite unusual with him.

The most probable view of the pathology of this case is that a functional paresis of the recurrent laryngeal nerve or nerves had occurred, in consequence of exhaustion, which was remedied by rest and stimulants, and that the voicelessness was due to the non-approximation of the vocal cords, which were no longer under the control of their adductor muscles. Possibly the hypoglossal nerves were simultaneously affected in the same way. This was the case at any rate on the last occasion.

This subject has been most ably handled by Dr. Morell Mackenzie, to whose work on 'Hoarseness, Loss of Voice,' &c., I refer for a complete account. He finds such functional paresis of the adductor and other laryngeal muscles to occur in various morbid states. Sometimes it has appeared to be due to malaria, and is then intermittent. Sometimes it depends on chlorosis and anæmia, sometimes on catarrhal congestion. Emotion, especially of an alarming kind, is prone to give rise to it. It is common in the second and third stage of phthisis. Gerhardt assigns rheumatism as one of its causes, or exposure to cold. The treatment is the same to a great extent as would be suitable to motor paresis in other situations. Nervine tonics should be administered, and the general health, if defective, improved, but local measures are, perhaps, even more important. Stimulating vapours, such as chlorine and creosote, may be inhaled, but the most successful proceeding seems to be direct faradization of the vocal cords and their adjacent muscles by a suitable conductor introduced during laryngoscopic inspection. This instrument was invented by Dr. Mackenzie, and is so contrived that the current does not pass until a spring in the handle is touched. There is, therefore, no risk of irritating the adjacent parts before the conductor is in contact with the locality on which it is desired to operate. The other electrode is placed in contact with the outside of the larynx.

Graves relates a case of neuralgia of the larynx occurring in a young lady originally of vigorous constitution, but latterly suffering from menstrual irregularity and hysteria. The pain had become almost constant under antiphlogistic treatment, but was by no means violent, except now and then, when it used to become suddenly aggravated. These paroxysms amounted to a most annoying feeling of distress about the whole region of the larynx. There was no external tenderness, and the internal fauces were healthy. This neuralgia, says Graves, was chiefly remarkable for a change of tone and weakness in the voice which invariably attended the paroxysms. The employment of tonics, carbonate of iron, quinine, arsenic, had the effect of rendering the attacks perfectly periodic. At 10 a.m. every morning to the minute the paroxysm commenced. The doses were increased, but the disorder was but little ameliorated (v. p. 834). It is worth observing how a degree of motor paralysis in the muscles of the larynx was associated in this instance with the neuralgia. The voice failed to some extent, no doubt, because the recurrent laryngeal was affected in the same way as the superior.

Pertussis is, of course, the capital example of a specific bronchial hyperæsthesia. The excitement of the vagi nerves, however, induced is clearly peculiar and not identical with that just noticed. It is consequently much less under the control of remedies. I do, however, by no means agree with Romberg that treatment is so ineffectual as he seems to consider it, and I believe that most physicians still retain faith in the utility of various measures. Dr. Whitehead has adduced[1] evidence showing how much the duration of the disease can be diminished by treatment. Thirty-five cases not treated till the disease had lasted three months were cured, on an average, in less than twenty-five days; and eighty-seven whose treatment was commenced within fourteen days after the onset were cured in the same time. Opium, usually as Dover's powder, and belladonna were the principal remedies. Trousseau, referring to Bretonneau's treatment of the disease by belladonna, says[2] "nous avons pu nous-mêmes constater l'extrême efficacité de ce moyen," and Vollant[3] affirms the same in the strongest terms. The latter uses only the powder of the root, which he gives in doses of gr. $\frac{1}{5}$, increasing the number from one to four or five a day till the paroxysms begin to subside, when it is given less frequently.

Dr. West confirms to a great extent Dr. Hamilton Roe's testimony of the efficacy of prussic acid, and has only in one instance out of many hundred known any actually poisonous effects to be produced by it.

The evidence for the real remedial power of this drug is worth considering, and our conclusion in its case may be applicable to others. Its sedative effect in some gastric hyperæsthesias cannot, we suppose, be questioned. It may, therefore, be admitted that it acts as a calmative to the filaments of the vagi distributed to the stomach, and consequently it is very probable that it will affect in the same way those which proceed to the lungs. An unbiassed and thoroughly reliable observer as Dr. West tells us that in some cases it "exerts an almost magical influence on the cough," while in other cases it seems perfectly inert, and sometimes injurious. Does not this warrant our regarding hydrocyanic acid as a remedy which may serve us well, but may also fail us, and forbid our rejecting it altogether? Moreover, there is some ground at least for believing that it is not a matter of indifference what preparation we use. Much of the variability in the results obtained from this as well as from other remedies depends, no doubt, on the dissimilarity of the preparations employed in different instances. We have just seen that Vollant lays stress on the use of belladonna root, deeming the leaves to have little efficacy. Hepp insists on the importance of carefully following Withering's directions in collecting and preparing digitalis. Not more than a year's supply, he says, should ever be kept. Is it not pretty nearly certain that nearly worthless drugs are too often employed? Bearing in mind the above, I am not at all shaken in my belief of the utility of treatment by finding that a great variety of remedies have been found or considered capable of arresting or diminishing the disorder in some instances while they have entirely failed in others. This, even admitting the purity and equal virtue of the preparations, as I have already observed, is a feature common to many disorders, and especially to neuroses. The idiosyncrasy of the individual patient, and the existence of numberless shades of difference in the nature and quality of the morbid processes, are quite sufficient to prevent our remedies from having that certainty of action which many look for, and, not finding, become sceptical of all therapeutic agency. Even with regard to non-specific bronchial hyperæsthesia, after considerable experience, I have no certain foreknowledge as to whether atropia, opium, or cannabis indica will be successful in a given case. I am quite ready to charge some of this uncertainty to my own want of discernment, but I am certain that cases are not uncommon where the symptoms are to all appearance quite the same, and yet the same remedies will have very different effects. One of the chief mistakes current at the present day is to regard all diseased states to which the same name can be applied as exactly and essentially similar, whereas the truth is that the same name covers a multitude of morbid conditions, which vary *ad infinitum* in their component elements. The gross outward resemblance leads us to overlook and neglect the concealed but more important differences. This is the more to be regretted as the latter rule the treatment.

---

[1] 'Third Report of Clinical Hospital for Children at Manchester,' 1857.

[2] 'Traité de Thérap.,' vol. ii, p. 71.

[3] 'J. de Méd. et de Chirurg. Pratiq.,' vol. xxxiii, p. 361.

With regard to pertussis I am much inclined to regard hydrocyanic acid as suited to an earlier period of the disease than atropine is; I give it during the catarrhal stage with vin. ipecac. and a saline. Combined with nitric acid it is very suitable also to a later period, when the catarrhal affection is less acute, the dry have given place to moist râles, and the febrile movement has subsided. When the cough is very violent, and the catarrhal affection is slight, I expect great benefit from atropine. I have, however, seen it in combination with nitric acid act exceedingly well in an infant suffering with severe bronchial catarrh, complicated probably with miliary tubercle. As to the objections raised by some against employing such potent agents, especially in young subjects, I think it may be fairly replied that medicine cannot be practised at all without care and attention, and a very moderate amount of these is quite sufficient to prevent the possibility of any injurious consequences from the administration of any of the alkaloids. It may be affirmed that atropia is actually safer to use than opium. The latter, if an overdose is accidentally taken, is more likely to be lethal than atropia, unless, indeed, the dose is very large. In the convulsions occurring in severe whooping-cough I have found atropia of some benefit, but not of so much as I had expected. I am doubtful at present whether opium is not preferable. The following case is a good example of a combined treatment, which will be suitable in many instances.

CASE 10.—A. S—, female, æt. 7, admitted November 12th, ill two months with whooping-cough; in mornings has hard strangling fits of coughing, after which she brings up about ʒij of blood. Some slight large-tube râles in backs. Takes food fairly. Has about twelve fits of violent cough in twenty-four hours. Pulse weak and soft. Tongue dark mahogany coloured in morning. Atropiæ gr. $\frac{1}{120}$ + acid nitric ♏ij + aq. ℥ss *ter die*. 26th.—Is quite a different child, cough a great deal better, does not spit any blood now, or complain of her head. Pt. c. mist. *subinde*. Dec. 30th.—Ol. morrh. ʒj *ter die;* vini ferri ʒj *ter die*. 14th.—Recurrence of cough. Reptr. mistr. atropiæ. 31st.—Better, does not cough so often, but has violent attacks now and then. Pt.

Jan. 11th.—Does not whoop now at all, but has very bad cough at night for one hour. Ferri et quin. citrat. gr. v *ter die.* Pt. c. oleo. 25th.—Cough nearly gone.

Dr. Wright recommends a combination of Vini Antimonii ♏xx + Tr. Aconiti ♏iv + Ferri Pot. Tart. gr. viij + Aq. ℥j, thrice daily and twice at night for an adult. Either ingredient is to be increased according as the inflammatory element, the muscular spasm, or the nervous impressibility predominates. I am not sure that I should always select the same drugs, but the principle of the procedure is sound—to vary the treatment according to the morbid condition of the individual patient.

Dr. Edward Smith states the cases are extremely few in which *slight* drowsiness has been produced and uniformly maintained for 3 or 4 days without the spasm having subsided, and the cough having been nearly reduced to the dimensions of a common. Sometimes the addition of a little carbonate of soda to the morphia is beneficial. This treatment is only applicable to uncomplicated pertussis. An able practitioner has informed me that sometimes children sleep almost continuously during the disorder, only waking up to cough and take food, and that they do better than others. This seems to be a confirmation of the propriety of Dr. Edward Smith's treatment. A case is mentioned ('Bull. gén. de Thérap.,' Nov. 30th, 1866) of rapid cure by means of subcutaneous injection of morphia. Brunniche ('J. f. Kinderskrank.,' Nov., Dec., 1859) expresses his approbation of Dr. Smith's treatment, and relates the case of a boy, æt. 5½ years, who had attacks of cough and vomiting always after eating, so that he fell into a state of marasmus, which was near endangering his life. Morphia was given, commencing with gr. $\frac{1}{48}$ *bis die,* and the dose gradually increased until the vomiting quite ceased, and improvement went on satisfactorily.

Bromide of Potassium and *Bromide of Ammonium* have been used by several physicians with good results. I have tried the former in a few instances, but have been disappointed, though I had a strong expectation that it would have proved as beneficial in this as it has in other hyperæsthesias.

Dr. Rees states that *Acetate of lead* in gr. ¼ doses 6tis horis removes the spasm on the first day of its exhibition.

Alum is certainly an efficacious remedy in the later stages, at any rate, of the malady. I prefer giving it in combination with a sedative, as the liquor morph. bimeconatis.

The application of a 20-grain solution of nitrate of silver to the upper part of the larynx, as recommended by Dr. E. Watson, is pronounced an admirable plan of treatment by Dr. E. Smith, and my own experience leads me to think favorably of it. It is, however, an unpleasant and difficult procedure to carry out with young children.

Much has been said lately relative to the good effects of the emanations evolved in the process of making coal-gas, and I believe that children are not unfrequently taken to the manufactories that they may have this advantage. Each visit should last 1 or 2 hours, and the number requisite for cure may vary from 3 to 30. The disorder is sometimes aggravated during the first 2 or 3. Opinions, however, are far from being unanimous respecting the utility of this medication, and at any rate it seems pretty certain that it should not be resorted to except in the absence of pyrexia and any notable amount of bronchitis.

When the disorder is on the decline, though still severe, all remedies act much more at an advantage than during its period of increase. Exposure to the open air, especially during favorable weather, is likely to be very serviceable. A very intelligent lady assured me that riding on horseback had been of the greatest benefit to her children—one young lady who coughed every 15 minutes while in the house would be out riding 2 or 3 hours without an attack. Change of air is also likely to be of much service at this period.

In cases of great severity, where the strength is in danger of being exhausted by the frequent and violent paroxysms of cough and retching, or in cases complicated with convulsions, the inhalation of *chloroform* should be employed, and should be carried on sufficiently long, and repeated sufficiently often, to tranquillise the nervous disturbance effectually. Dr. Walshe, however, objects decidedly to the induction of narcotism. In any case where convulsions occurred I should be much disposed to employ Bromide of Potassium. To an infant 15 months old I gave gr. ij of this salt + gr. $\frac{1}{150}$ of atropia *quater die,* and I think with good effects as regards the cough and convulsive attacks. In some cases of this kind an alcoholic stimulant might be of much service; none better, perhaps, than brandy and milk.

The affection termed LARYNGISMUS STRIDULUS, or spasm of the glottis, is one of peculiar interest, not only as a well-marked instance of nerve disorder capable of receiving a satisfactory explanation from established principles, but also on account of the great peril to life attending it. The child which but a minute before appeared tolerably well may the next be laid lifeless in its parent's arms. The suddenness of the stroke, which we know may fall at any moment, adds much to the painful interest with which we must regard these little patients. The following cases will serve as a text for some comments.

CASE 11.—A. R—, male. æt. 2, admitted April 6th, ill two months. Has had from the first attacks of convulsive character, apparently consisting of laryngeal spasm. A baby belonging to the same mother was attacked last week suddenly and died immediately. This child had the disease when 8 months old, got better during the summer, but has been worse the last winter. Has some cough, varies much, some days the attacks occur every hour. Bowels open. Tongue much coated. Lives in a kitchen. Is a very weakly child, does not walk. Two upper incisors are just making their way through the gum (lanced). The condition of the alimentary mucous membrane was corrected by small doses of grey powder and olei ricini, and ferro-citrate of quinine was steadily administered for nearly eight weeks, during which he was taken out into the open air. Under this treatment he improved so much that he ceased attendance by the end of May. No relapse occurred or none of importance till the beginning of the following November, and then the repetition of the same treatment, together with ol. morrh., proved curative.

The relation of the disorder to dentition in this case was not at all well marked, nor was there any other apparent exciting cause. I believe the nervous centres were more at fault than the peripheral structures. The tonic probably arrested the disorder by lessening the excitability of the medulla oblongata. The weakly condition of the little patient was presumably the cause of the morbid state of this centre. The nervous erethysm was neurolytic.

CASE 12.—G. H—, male, æt. 10 months, seen January 17th, 1861. Is suffering severely with attacks of spasm of the glottis, which occur about every twenty minutes. The affection commenced gradually with very slight attacks six weeks ago; it has been much worse during the severe frost. About sixteen days ago he had a well-marked convulsive seizure, which has not recurred since. In the attacks he first turns pale, throws his head back, the commissures of the lips are drawn backwards in a kind of grin, the face becomes sub-livid, there is a period of silence, and then comes the peculiar stridulous inspiration, which recurs several times, and is followed by a natural cry. He is greatly depressed, his face looks sunken, he seems ill and rather emaciated. Bowels rather costive. No fever. Is teething, and has had the gums lanced twice or thrice, but the last time it appeared to be of no benefit. Until lately has been a remarkably placid and healthy infant, without any tendency to diarrhœa. He has been brought up by hand. Three or four times a day he takes small doses of ol. ricini + ol. terebinth., besides ferri carb. sacch., and a small opiate at night. 19th.—This afternoon he had a sharp attack of convulsions, and during the whole evening and early part of the night had frequently glottic spasms, and was crying with pain. Chloroform was repeatedly administered, and with good effect in tranquillising him, but its influence soon passed off. After taking ♏ij of liq. morph. bimec. he was quieter and slept. 21st.—Yesterday began to take extr. belladon. gr. $\frac{1}{12}$ + ol. tereb. ♏iij *ter die*, had morphia in the night; is on the whole quieter; a second dose of liq. morph. bimec. ♏iij was given to-day. Bowels open. 24th.—Last two days is decidedly better, taking little but the morphia; the attacks of glottic spasm are much less frequent and severe, but diarrhœa has begun, the bowels which before were costive being loose and gripy, and the stools green. 28th.—Worse last three days, has severe and frequent attacks, great restlessness, especially at night, and suffering evidently referred to the mouth, the gums look natural. He takes tr. bellad. ♏iv—v 2*dis* vel 4*tis horis*. 29th.—The belladonna entirely failed to give relief, although it evidently deranged his vision; he has to-day been taking liq. morph. bimec. in ♏iv doses *bis* vel *ter die*, and is now quieter. Takes very little food. 31st.—Is better, and has less attacks, takes morphia. Feb. 4th.—Is very much better, the attacks of laryngismus have ceased. 7th.—Going on well, no medicine. 18th.—Has had a little return of the laryngismus, but not material; is otherwise fairly well. March 9th.—Has still the laryngismus occasionally, but is doing well, gaining strength; takes morphia daily. 18th.—Had yesterday some very severe attacks. April 18th.—Numerous and severe attacks of laryngismus lately, and this morning a fit of convulsions, in which his face was markedly pale. The upper lateral incisors are now advancing, but the gums do not appear tense or red (lanced). After this the attacks gradually ceased. Nov. 21st.—At the beginning of June he went into the country, where he remained about three months, and returned quite restored. He is now cutting his first molars, and though he has had some catarrh there has not been the least return of the laryngismus. Jan., 1864.—No return of the disorder, the child has thriven well.

The relation of the disease in this case to dentition is by no means clearly established. It certainly supervened about the commencement of the process, but it subsided long before it was over, and the aggravations of the disease did not evidently correspond to the period of eruption of a tooth. Whether there was some deep-seated irritation connected with the development of the teeth can only be conjectured; if so, it only existed during the formation of the earlier teeth. The three points which the history seems to set forth prominently are—(1) the connection between the disease and general convulsions; (2) the good effect of morphia and the inutility of belladonna; (3) the importance of change of air. The occurrence of general convulsions in connection with laryngismus indicates that the morbid action extends to and involves some larger group of nerve-cells than in the local spasm, probably either the whole of the medulla oblongata, or the corpora quadrigemina also. The convulsions as well as the glottic spasms appeared to depend much more on a state of erethysm of the nervous centres than on any peripheral irritation. I mean that the former was much the more important causative element, the removal of which would have arrested the morbid phenomena. This is evidenced also by the "juvantia, sedatives affording relief, while lancing the gums had no decided good effect. I am much inclined to refer the supervention of the disorder to the severe cold of the winter, which depressed and deranged the "vis nervosa." The first attack of general convulsions occurred during a hard frost. In this instance, as in some others, it has certainly appeared to me that the prevalence of severe cold has materially promoted the occurrence of general convulsions. The cold seems to depress the nervous power of the little patients, and make exciting causes of disorder more operative. The inference from this is that the child should be kept during cold weather in a well-warmed room, at a uniform temperature, say of 64 deg. F., and that this should be maintained night and day. The sudden death which is by no means uncommon in this disease depends, I conceive, on the transmission of irritation along the cardiac fibres of the vagi to the heart, which is then arrested in its action just as when the pneumogastrics are strongly galvanized. Life truly hangs by a thread, while we know not whether in any one of the attacks the nerve disorder may not take this fatal direction, instead of invading the recurrent laryngeals only. The superiority of morphia to belladonna was unequivocal, a result which was not anticipated, on account of the greater tendency of opium to cause tetanic phenomena. It is very possible that in another instance the result might be different, but it is as well to remark that in the fatal case of epileptic disorder recorded at p. 70 the attacks subsided under the administration of morphia. The doses given were certainly large, the strength of the bimeconate being about equal to that of tr. opii; they produced, however, no trace of narcotism. This shows that the erethysm of the centres must have been considerable. The carbonate of iron which was tried was certainly of no benefit, if not injurious. This result contrasts strongly with the good effect of tonics in the other case. It may be accounted for, I think, by observing that the subject of the first case was a very weakly child, while that of the second was the reverse. The condition of the latter was more sthenic than that of the former. All this corroborates what has been before said as to the difficulty of determining exactly the remedy suitable to an individual morbid state, and shows how the self-same symptoms may result from different pathological conditions. The attacks had, indeed, ceased before he was removed into the country, but the great improvement which ensued in his health makes it eminently probable that his subsequent immunity depended on the calming and toning influence of the purer air. Considerable intermissions had previously occurred, but had been followed by relapses. Romberg writes respecting the free intervals, "the first thing to attend to is the atmosphere and the diet." This is quite my own feeling, and indeed in all neuroses attended with a high degree of sensitiveness and excitability, and not depending on an eccentric cause, I look to the influence of a pure, rather bracing air as the sovereign'st remedy. Tonics are apt to prove too irritating and sedatives to lose their efficacy.

In an able paper on this disorder (v. 'Brit. Med. Jour.,' March 7th, 1857) Mr. T. Paget lays down the following directions for treatment, with which to a great extent I concur. After removing all peripheral causes of irritation, whether dental, intestinal, or elsewhere seated, he contemplates the subjection of nerve excitement by means of narcotics as the most important object. "Upon the narcotic to be used, upon the mode of giving it, or the dose required, I need lay but little stress, especially since it is well known how varied is the susceptibility of individuals in reference to this class of medicines. Suffice it to say that the drug I have most used is opium; that beginning with small doses and cautiously regulating them according to their effect, I do not stop short of producing a constant drowsiness and some slight pallor; that when this state is obtained the paroxysms decrease in force and frequency, the infant is calmly sleeping its day away, no longer devil-torn, nor are its friends racked with anxiety; and that when the paroxysms have failed to occur for some forty-eight hours, which will usually happen in from three to six days, the drug is gradually withdrawn, the quantity taken off each dose being immediately restored if the attacks show the slightest disposition to encroach again. I may say, also, that to attain to the required effect I have usually been obliged to give to children 4 or 5 months old (the age at which the disease most commonly, perhaps, invades) from 1 to 5 minims of tr. opii in a dose with 4 or 6 of sal volatile two or three times a day; or if in enemata 5 to 7 minims." The reader will not fail to remark the close resemblance of this practice to Dr. Smith's in pertussis, nor to note how in both cases the end is obtained of abating the disorder, not by removing the cause, but lessening the impressionability of the system.

The following highly interesting case recorded by Dr. Morley Rooke (v. 'Brit. Med. Jour.,' 1868, Vol. I, p. 370) is of much practical value, as introducing to our notice two remedies, both of which may, I believe, render important service.

Case 13.—Dr. Rooke says, "About 12 months since my youngest child, aged 9 months, was put down one day from his nurse's lap on the floor. The child began to cry slightly, and for not more than half a minute, when the nurse noticed that it suddenly ceased to breathe, and turned black in the face. She caught it up, shook it, slapped its back, &c.; but the child simply fell over apparently quite lifeless on her arm. She then ran screaming with the child to me in another part of the house. The impression I got in the hurry and excitement of the moment was that the child had, unseen to the nurse, swallowed something that was choking it. The little patient, when he reached me, showed no sign of life, his lips were blue and swollen, his face a livid grey, his eyes half closed and glassy. He had, indeed, the appearance of a recently drowned person. Hastily I thrust my finger between his teeth to the fauces, thinking I might feel some obstructing body, when the child gave a short heave and gasp. I repeated the movement, and this was followed by a stronger heave and decided inspiration, and in a few more seconds the child was breathing and living. I feel pretty certain that without the manœuvre I had recourse to (though with a different end in view, as I discovered no foreign body) the child would never have breathed again. On two more occasions at intervals of 2 or 3 weeks the child was similarly attacked. The occlusion of the larynx was on each occasion as complete as at the first, and both times he was brought round by the same proceeding on the part of the nurse." Dr. Rooke says the physiology of the process is pretty evident (no doubt as an excitor of inspiration), and justly says it may lay claim to some novelty. Reasoning on the affinities of the malady, he perceived its resemblance to epilepsy, and on this view, and as means previously tried had been useless, he administered Bromide of Potassium to his little patient after the third fit. The dose at first was gr. j *bis die*, afterwards increased to gr. ij. He took it for 10 or 11 months, and never had another fit, and has remained in excellent health.

Another case of a similar kind has been recorded by Dr. Cheadle (v. 'Brit. Med. Jour.,' June 13th, 1868).

Case 14.—The patient was a stout healthy looking boy, 1¾ year old, who became subject to tonic spasm of the flexor muscles of the hands and feet. After about a month attacks of laryngismus stridulus supervened. When seen by Dr. Cheadle the hands and feet were firmly contracted, and were bluish and swollen, the abdominal muscles were rigid and hard, but there was no contraction of the masseters or temporals, and no opisthotonos. It is worthy of remark, says Dr. Cheadle, that the muscles which are least affected in tetanus are most contracted in these cases, and those most affected in tetanus are generally free from the tonic spasm of laryngismus. The cause of the spinal irritation was evidently teething. The stools were reported to be dark, slimy, and offensive. With Potass. Bromidi gr. ij + Tr. Bellad. ♏ij *6tis—3tiis horis*, and a dose of grey powder, so much improvement ensued that the child seemed almost well. After about ten days a severe relapse occurred, evidently in connection with the advance of the canines and first molars. This was subdued by a more free exhibition of the same remedies, gr. iv of Bromide + ♏iv of tincture of Belladonna being given 4*tis horis*. Pertussis then came on, and though the cough was severe was attended by no laryngismus. No attack occurred for 7 or 8 days, but 2 days after the Bromide had been replaced by Hydrocyanic acid + Liq. Opii a violent seizure ensued, which proved instantly fatal.

The following case is very similar to the preceding, but had a more prosperous issue. It was under the care of Dr. Palmer, with whom I consulted as to the administration of the Bromide.

Case 15.—A baby, female, æt. 7 months, daughter of a schoolmistress, was seen March 24th, 1869. The mother had a mobile nervous system, and in her last two confinements suffered an epileptic attack. Subsequent to the last she had rheumatic fever, during the early part of which she suckled the child. The little patient has had a few slight fits at intervals; in the early part of her illness she was very restless at night, and screamed out often. At present both hands are rigidly flexed on the wrists, with the fingers extended and extremely stiff. Great toes are markedly flexed. Is stated to have frequent catchings of the breath till she is dark in the face, and sometimes almost strangled. Has much difficulty in swallowing milk, which regurgitates even through the nose at times. Pupils unaffected. Head not hot. Motions intensely unnatural, green, white, clay coloured, inodorous. No appearance of teeth. No febrile movement. Grey powder and calomel and Dover's powder produced some improvement for a day or two, after which the laryngismus and deglutition became worse. On April 1st the child had a distinct epileptic fit, lasting one minute, and on the same day Potass. Bromidi gr. ij *3tiis horis* was commenced. From the first the breathing in both backs was not clear or perfectly satisfactory, as it was in front, but no râle or tubular breathing was heard. 2nd.—A tooth has unexpectedly come through, an inferior incisor. Respiration thoroughly healthy everywhere, no fits since mid-day yesterday, catchings less urgent, fingers certainly less rigid, swallows better. 3rd.—All symptoms improving, two or three good coloured motions. 5th.—Is much better, fingers nearly quite free. 8th.—All but perfectly well, only one catching of breath in 2 days, fingers nearly as free as in health. She recovered completely.

Mr. Roberton, in an interesting paper (v. 'Med. Times and Gaz.,' 1865, Vol. I, p. 32), contends that the most effective remedy for child-crowing is exposure to dry cold winds, and gives five instances of its successful application. He premises, however, scarification of the gums, correction of the alvine secretions, free sponging of the body every morning with cold water, warm clothing, and careful attention to the diet. The first case may be cited as a specimen.

Case 16.—E. H—, æt. 1 year, teething, and having irritation with the upper incisors, the lower alone being cut, had crowing spasms very frequently, and while in them was stiff and struggled severely. The thumbs were turned into the palms of the hands, and there was blueness always remaining under the eyes and round the mouth and nose. Was taken in January to Alderley, but the weather being damp and close she grew rapidly worse while there, having as many as 32 attacks of crowing in 24 hours. At the end of a week she was brought back to Manchester, and then taken without delay to the shore below Liverpool. There the weather was found to be intensely cold, and a strong and bitter east wind blowing. Sometimes the nurse who carried baby could hardly stand with her in her arms, so strong was the wind. Baby was a month at the shore, being out in all weathers for about 6 or 7 hours a day. From the end of the first week there was evident improvement, and by the end of the third the crowing spasms had ceased, nor has she ever suffered from a return of them. She was sponged with cold water night and morning, had careful attention paid to the diet, especially as to the quantity she ate, and before the two upper front teeth (which caused her much suffering) came through, the gum had been lanced 11 times. She is now a strong healthy child.

Mr. Roberton's facts are sufficiently proving as to the benefit which may be derived from the free exposure to a cold air, and it will be observed that they harmonise with some experience of the same agent in pertussis, and with the general notion of the disease as a neurosis dependent mainly upon central disorder, and not merely on peripheral irritation. I confess, however, that I should wish to exercise some discrimination in selecting the cases for this remedy, as it certainly appeared to me in the case I have narrated above that the disorder was aggravated by severe cold weather. In many instances of this and of other neuroses I can well believe, as it is said of phthisis, that the danger is rather in staying in the house than in going out of it.

Asthma is by general consent acknowledged to be essentially a neurosis, though it is rare to meet with it in a pure form. Usually it is attended with more or less of bronchitis, just in the same way as retinal hyperæsthesia is with conjunctivitis, while spasm of associated muscles is a prominent feature in both cases. The view usually taken of the special seat of the neurosis is that it affects those branches of the vagi which are distributed to the bronchial muscles, and that the latter, being spasmodically contracted, seriously obstruct the access of air to the cells of the lungs. It would be expected, according to this view, that the chest would be rather diminished than expanded in size, and such appears to be sometimes the case. That excellent observer, Dr. Walshe, states that there is sinking of the epigastrium and elevation of the diaphragm (evidently from the diminished mass of air in the lungs). Dr. Flint[1] (citing from the latter) says that "if emphysema be not present the volume of the lungs may be so reduced by the expiratory efforts as to diminish appreciably the clearness on percussion." It appears, however, that this is not a constant and invariable condition, but that it may be replaced by the opposite. Wunderlich[2] describes one form of asthma as consisting in a gradual augmentation of the dyspnœa which reaches its maximum at the end of two or three days. At this stage the chest is almost motionless in spite of the most violent muscular efforts, the percussion resonance is everywhere preserved, and after many hours the limits of the chest are extended downwards. The liver also descends, the heart is thrust into the epigastrium, and the thorax is excessively distended. Théry[3] also describes the thorax during the paroxysm as being in a state of the greatest distension, as in a forced inspiration. The diaphragm, however, contracts sometimes so forcibly as to depress the lower end of the sternum backwards. Kidd[1] and Sanderson[2] describe this state of great distension as that which is characteristic of asthma, though they differ as to the mode of its production. The former refers it to a tonic spasm of the muscles of inspiration; the latter to a relaxation of the dilator muscles of the glottis, as well as of the contractile fibres of the lung tissue—in consequence of which expiration cannot be properly performed. There can be, I think, little doubt that the view held by the last two observers is too exclusive, and that except in cases complicated with extensive emphysema there is no notable, if any, dilatation of the chest in the earlier part of an attack of pure nervous asthma. That in the course of a prolonged fit the chest should become distended is quite intelligible if we consider that the inspiratory power is much superior to the expiratory, and that the air gradually accumulates in the lungs, being locked up, as it were, by the bronchial constriction. Salter, who has most ably studied the whole subject of asthma, adopts the theory of bronchial spasm of nervous origin, and states that the chest distension is dependent on the demand for air, and is observed in all states of insufficient aëration of the blood. The circumstance that during the worst of an attack the expectoration is scanty, or nil, is tolerably good proof that the small arteries of the bronchial mucous membrane are constricted during this time, and adds to the probability that the bronchial tubes themselves are in the same state. It must be admitted, I think, as pretty certain that hyperæsthesia of the sensory filaments of the vagi cannot be the essential pathological state, for this, as we have lately seen, induces, not spasm of the minute bronchi and exaggerated action of the *inspiratory* muscles, but violent action of the *expiratory* in cough, with more or less copious expectoration. The shifting of the dry râles heard during the paroxysm from one part of the chest to another affords some evidence that the smaller tubes are at intervals narrowed so as to produce such sounds and again relaxed. The general depression, the chilliness of the skin, the smallness of the pulse, the aqueous quality of the urine, remind one somewhat of the cold stage of ague,[3] in which, by the way, along with various spasmodic phenomena, there is "distressed and anxious breathing." If the inspiratory muscles were primarily affected, so as to keep the chest in a state of almost permanent inspiration, there is little doubt that the will would be able to interrupt occasionally this morbid action, and to procure every now and then a forced expiration, so that the used-up air might be expelled from the lungs. This, however, there seems no power to do. From these and other considerations I am led to regard true asthma as a tetanoid disorder of the motor nerves of the bronchi, and as in great measure dependent, like epilepsy, on morbid excitability of certain nervous centres, which are probably located in the spinal rather than in the encephalic districts; this I conclude from the absence of any tendency to general convulsions in the asthmatic paroxysm. No doubt there are many cases where the peculiar excitability would remain inoperative, except for some peripheral irritation, just as in epilepsy; and there may be great varieties in respect of the relative importance of the central and peripheral causes; the former, however, I hold to be the more essential and constant element of the malady. The necessity of a peculiar predisposition is fully as apparent in asthma as in epilepsy. The nature of this predisposition may vary very much; it may consist in a tendency to skin eruption, to gout, or rheumatism, or hæmorrhoids, or periodic hemicrania, or uric acid deposits. All these, as Trousseau states, are affections which asthma may replace, and which in turn may replace asthma. Dr. H. Salter mentions an interesting case in which regular epileptic attacks were occasionally supplanted by asthmatic, the lungs being sound (p. 44). This diathetic tendency which so often leads to asthma is frequently derived from hereditary descent. The extraordinary capriciousness of asthma is notorious, and is certainly a matter of high interest and significance. It proves how wonderfully slight and subtle may be the influences which act with great effect on certain states of the nervous system. Were it not well ascertained how very slight a change in locality will make all the difference to an asthmatic, we should feel much disposed to consider the notion as the result of a morbid imagination. This should be remembered by us in dealing with other and still more obscure neuroses. The influence of the withdrawal of light on asthmatics is remarkable. One of my hospital patients, a male, æt. 35, declared that "when it gets dark he is done altogether," and another, a female, æt. 75, found her paroxysm come on at nightfall, whether this occurred early as in the winter, or late as in the summer. Trousseau[1] mentions the case of an asthmatic who when his attacks came on had five or six moderator lamps lit in his room, and was immediately relieved. Though the neurotic character of asthma is, as these and many other facts show, extremely marked, yet it is clear that it differs from many of the more common, and especially the sensory neuroses, in that it is not associated, at least frequently or intimately, with marked signs of nerve debility. On the contrary, as Mr. Pridham observes, asthmatics are for the most part gifted with extraordinary energy and talents. The admirable Trousseau, who acknowledges his infirmity in this respect, is an instance in point.

---

[1] 'On Respirat. Organs,' p. 397.

[2] 'Pathologie,' III, 316.

[3] Merkel's "Report on Asthma;" Schmidt's 'Jahrb.,' vol. cix, p. 229.

---

[1] 'Dublin Quar. Journ. of Med. Sc.,' May, 1861.

[2] 'Med. Times and Gaz.,' May 16th, 1863.

[3] Théry says, "Agues run parallel with, or alternate with, asthma . . . the primary cause may determine both disorders."—Schmidt's 'Jahrb.,' vol. cix, p. 237.

The production of asthma by irritation that might easily escape notice should be borne in mind. Dr. Hyde Salter mentions some remarkable instances. One is that of a man in whom an attack was surely induced by any omission of the usual daily alvine evacuation. In another the same result followed immediately on the application of any chill to the instep, and the attacks were very severe. In such cases the irritation is, of course, peripheral, and so it is probably in the majority when it takes its starting-point in the gastric or bronchial mucous surface. In a small number of cases the irritation proceeds from the encephalon, and is propagated downwards to the centres which preside over the innervation of the lungs. The view suggested by Dr. Salter seems very probable, and capable of application to many other states—that blood may be normal according to the standard of ordinary health, and yet a cause of irritation to an asthmatic. The products of a healthy digestion may be for a time so far dissimilar from the blood with which they are mixed as not to be tolerated without difficulty by the hyper-excitable nerve-centres. This view enables us to understand how an asthmatic at a festive social gathering may be able to enjoy his repast without suffering for it, though he may commit what to his usual abstinence are serious excesses. The fact is that his digestion is not really at fault, but his nerve-centres, and if they are beneficially stimulated and engaged by pleasant society and conversation the dangerous hour passes away before they relapse again into their morbid susceptibility. The great number of different excitants of asthma, the extraordinary individual susceptibilities—as to the emanations from cats, dogs, and other animals—seem to me very proving as to the differences in original constitution of nervous tissue. The nerves and nerve-cells cannot be truly the same in patients who are disordered by these excitants and in healthy persons. There is far too much tendency at the present day to disregard these invisible differences, yet these are they which give very much of its shaping and quality to morbid action, and the recognition of which is essential to successful treatment. The fact stated by Trousseau is important, viz. that certain bronchitic attacks of great severity simulating catarrhal pneumonia are in reality only masked asthmas. Though an inflammatory element certainly forms a component of the disorder, it is altogether subordinate to the nervous element, and a speedy recovery ensues when the treatment is regulated accordingly. The first case which Trousseau met with he took for one of broncho-pneumonia; the lungs were full of subcrepitating râles, the breathing was so much interfered with as to threaten suffocation, and the disorder had come on very rapidly. The child recovered with one large flying blister in 3 days, on a second similar occasion without any active treatment in two, and a third time when the symptoms were quite as formidable in 12 or 18 hours by the aid of datura fumigations. The mother of this child, and of another similar patient, were of hysterical temperament.

---

[1] 'Clinique Méd.,' vol. ii, p. 402.

It seems as if in these instances the spasm causing action of the nerve-filaments supplying the bronchial muscles was associated with a paralysis of the vaso-motor nerve-filaments. The same thing is seen in the skin during an attack of urticaria, the whity elevations are surrounded by hyperæmic red areas.

The treatment of asthma is eminently that of a neurosis. It consists first in the removal of all causes of irritation, such as catarrhal inflammation of the bronchi, dyspeptic disorder, unwholesome diet, and unsuitable climate, &c., and secondly in the use of various appropriate tonics and sedatives. The prophylactic management of asthma involves as one of its most important parts the selection of a suitable locality for the invalid's residence. This can scarcely be determined except by trial. It should be borne in mind that the air of large towns is not in a few cases more beneficial to an asthmatic than that of the country, and that where there is a tendency to asthenic bronchitis a relaxing climate is unsuitable. Though the averting of pulmonary catarrh is highly desirable, we must remind our patients that no amount of guarding against cold will protect them against the stroke of influenza, which, by the way, seems to me to be far the most frequent cause of catarrh; and also that the best way of effectually resisting the morbific action of cold is to tone and fortify the system so that it may be well able to endure it. It is truly a remarkable thing how the same temperature that withers and destroys the feeble vitality of the two extremes of age, invigorates and increases the life of the strong and healthy. An old lady, however, under my care told me once that she was "quite well and wound up" as long as a sharp frost continued in December; as soon as the thaw set in she got a cold, tracheal cough and expectoration. On the frost setting in again sharply she rallied and became more vigorous. It was remarkable this year, 1864, how very general catarrhs became as soon as the frost ceased. Cold bathing or sponging, regular outdoor exercise, a sufficient but not excessive amount of clothing, avoidance of damp, chilling draughts when sitting still are the main points to be observed by the invalid who is fearful of taking cold. Of course in every case judicious adaptation of general rules to the individual condition is essential. The importance of a duly-regulated diet is well known, and has lately been especially illustrated by Mr. Pridham.[1] He restricts his patients at first to two ounces of fresh meat with as much dry bread for dinner at one p.m., and the same for supper at seven, allows a cup of tea with cream and dry bread in the morning, and for drink weak brandy or whisky-and-water, which is not to be taken till three hours after animal food. Rest is also enjoined for the same period, though air and exercise are recommended. Three grains of extr. conii are given four times a day, just one hour before each meal. As the symptoms improve the diet is increased, though it is still very spare and simple. The rationale of this proceeding is very evident, it is manifestly well adapted for patients who betray any symptoms of disordered digestion or assimilation. As there seems no doubt that the materies morbi of gout may give rise to asthma, so it is very possible that unhealthy products of digestion may act in a like manner. In most of Pridham's cases the urine was habitually loaded with lithates, indicating an excess of acid passing off by the kidneys. The more our pathological knowledge increases, the more do we find that many different causes are capable of producing the same effects. Pridham professes to treat in the above way only what he terms dyspeptic asthma, though he seems inclined to extend the significance of the term rather widely, as he says that he is convinced that an asthmatic person can never with impunity eat and drink as other people do. An inveterate asthmatic who was once under my care told me, however, that though he was obliged to be careful in his diet, yet he could go out to a dinner party and eat and drink like any one else and not be the worse for it. He also found, as indeed occurred while I had him in view, that when he got bronchitis the asthmatic attacks ceased. Trousseau gives an exactly similar case. Such instances show clearly the essential difference between inflammatory catarrh and asthma. Gymnastic exercises, riding, sawing, bowling, have been praised for their good effects, and as tending to diminish excitability, and increase tone and strength they are likely to be useful. Compressed air has recently been introduced as an agent in the treatment of various pulmonary affections including asthma. Sandahl, in his paper,[1] states that of fourteen cases of asthma and pure simple pulmonary emphysema all were improved, and twelve, as far as could be made out, had experienced no relapse. Of seventy-seven who suffered with asthma, emphysema, and chronic bronchitis, fifty-seven were improved, and twenty either doubtfully or not at all. From Vivenot's observations[2] it appears that the effects on the system are slowing of the pulse and the respiration, diminution of the pulmonary and cutaneous exhalation, increase of the urinary secretion, and prevention of congestion in the parts on which the air acts. It may reasonably be expected that benefit would result from these baths in all cases of catarrhal affection of the air passages, but in pure spasmodic asthma it is not very apparent how they could act beneficially, nor does there seem sufficient evidence to prove that they have done so. M. Beau[3] finds sulphuret of potassium baths not only to relieve the attacks of asthma, but to prevent their recurrence. Each bath should last twenty minutes, and thirty should be taken, one every other day. The temperature should be 86° F. Certain tonics seem to be of real use in not a few cases. I have found arsenic sometimes of much advantage, administered in doses of ♏iv—v of Fowler's solution *ter die*. It may be given with ammonia and tr. camph. co., or alone, or with an ordinary cough mixture according to circumstances. We should assure ourselves before giving it that it is likely to be tolerated by the stomach. Both Trousseau and Dr. Salter speak of Potass. Iodid.

---

[1] 'Brit. Med. Jour.,' June 9th, July 28th, September 1st, 29th, November 17th, December 29th, 1860.

---

[1] Schmidt's 'Jahrb.,' vol. cxx, p. 178.

[2] Schmidt's 'Jahrb.,' vol. cix, p. 335.

[3] 'Jour. de Méd. et de Chir. Pratiq.,' vol. xxxiii, p. 440.

as a remedy which succeeds extremely well in some cases, but fails, or may even be injurious in others. It does not at all appear how we are to discover beforehand the cases to which it is appropriate. It is not only the gouty or the rheumatic gouty who benefit by its use. Dr. Salter warns us that we may be disappointed unnecessarily if we abandon its use too early; it may be necessary to give it a fortnight or more before much improvement is apparent. When there are indications of gastric as well as of bronchial catarrh, nitric or muriatic acid is preferable in combination with acid. hydrocy. dil. and tr. calumb. When there is bronchial catarrh alone atropia with or without nitric acid is a valuable remedy. I have had a case recently under my care which has terminated very satisfactorily under atropia gr. $\frac{1}{120}$ *ter die*, and tannin with Canada balsam in pills. Atropia is a remedy on which I feel much inclined to rely both from experience of its power as a sedative, and from the observations of Dr. Williams as to its abolishing the contractility of the bronchi, which is just what is desirable in asthma. Cannabis indica has occasionally proved very useful, gr. $\frac{1}{2}$ doses of the extract immediately checking the spasm. In one case where asthma supervened upon phthisis great relief was afforded by the subcutaneous injection of liq. opii sed. ♏x into the left front of the chest. In another very severe case the same means in the left arm was of great service. M. Courty[1] has also obtained very good results from subcutaneous injection of atropine (gr. $\frac{1}{35}$ thrice repeated) in the vicinity of the left vagus nerve. Dry cupping should be persistently employed as long as there are signs of congestion of the bronchial mucous membrane. M. Duclos praises the efficacy of Flores Sulphuris gr. 7—15 *o. mane* in all cases, but Trousseau thinks the drug is only beneficial in those who have an herpetic diathesis, *i. e.* are liable to cutaneous eruptions. With regard to the shorter and severe paroxysms I can do little more than enumerate the various remedies which have been found efficient. Ice pills, according to Romberg, often afforded instant relief, and inhalation of sulphuric ether or chloroform may be very serviceable. Smoking tobacco, or stramonium, or a compound of the latter with belladonna, will sometimes quell the spasm. Ipecacuan emetics may be given for the same purpose. Opium combined with spt. æth. s. co. has in some cases a good effect. Nitre paper should not be forgotten, made according to Dr. H. Salter's formula by soaking red blotting-paper in a solution of ℥iv of pot. nitras in aq. Oss. In some instances Ducros' medication or a modification of it is beneficial. He brushes the posterior wall of the pharynx with a strong solution of ammonia, liq. ammon. + aq. āā ℥j. The first time that Trousseau tried it he thought the patient would have died suffocated. He states, however, that "employé dans une juste mesure il a rendu de réels services." Probably M. Faure's plan is preferable. He puts ℥ss of liquid ammonia in a bowl, and desires the patient to inhale the vapour, taking care, however, to close the nostrils. The inhalation is to be continued for fifteen minutes, and to be repeated four times a day. Trousseau relates that the captain of a ship was always exempt from the paroxysms while his vessel was loaded with guano, or he was staying at the gathering grounds. Various stimulants are occasionally beneficial, strong coffee, tea, ammonia, and alcohol. Dr. Salter has published some remarkable evidence of the power of very large quantities of the latter to subdue paroxysms of the disease which had proved refractory to all other measures. Intoxication was not necessarily produced. The efficacy of alcoholic and other stimulants I believe to depend on the circumstance that their action on the nerves or nervous centres replaces advantageously the morbid action which previously affected them. We have here another instance of the affinity between spasm and paralysis, both being advantageously treated by the same means.

---

[1] 'Gaz. Méd.,' November, 1859.

To prevent recurrences Trousseau advises a compound medication consisting of ten days of small doses of belladonna, as many of turpentine, and the remaining tenth of the month of arsenical cigarettes, besides a sixty-grain dose of powdered calisaya bark in coffee every ten days. This plan must be followed out a long time and very exactly.

Sneezing and *hiccup* are two minimum disorders as they usually occur, but they occasionally develope themselves to the dignity of a disease. Romberg cites several instances of the former occurring either in his own experience or in that of others. It is met with occasionally as an accompaniment of hooping-cough, and of verminous disorder, as well as in the so-called hysterical state. Mosler relates a case[1] in which a scrofulous female was computed to have sneezed 50,000 times in eighty hours, and the neighbourhood was alarmed! She was amenorrhœal, and the disorder returned a month after its first attack. Dr. Peter Young mentions a case where the patient had been the subject of constant sneezing during pregnancy. The application of a sinapism to the back had the effect of allaying this distressing symptom, but not until the uterus had become so affected, probably by the straining efforts, that a miscarriage was induced. The same patient again became pregnant, and again became affected by the same constant sneezing after she had arrived at between the 3rd and 4th month. It was a question whether the sneezing was not caused by the fœtal movements, as it began about the time when they were usually perceived for the first time ('Edin. Med. Jour.,' November, 1861). The only instance I have met with was in the person of a mid-aged gentleman, who had suffered from dysentery in India, and had quite recovered, but no doubt still retained something of the malarious influence, which gave rise to the nasal flux. Romberg describes ordinary sneezing as a reflex act excited by irritation of the nasal filaments of the fifth pair, as well as by other filaments of the same nerve, and of other and remote nerves, such as the intestinal and uterine. This is, no doubt, true in many instances, but it seems to me also pretty certain that the morbid action is very often central rather than peripheral in its seat. In fact, where no cause of peripheral irritation can be discovered, it seems most reasonable to suppose that the seat of disease is in the part where most vital action and change is going on. At any rate, the possibility of this cannot be denied. The circumstance which I have often observed that a hot room will cause sneezing which subsides when the air is cooled is in favour of this view. The heat relaxes the general tone, but could not irritate peripheral nerves. One circumstance which appears very noteworthy in sneezing is the muco-watery secretion which is sometimes very considerable. In one of Brodie's cases the watery fluid dropping from the nostrils was sufficient to wet a handkerchief completely through. Now, it is certain that the exudation is not the mere result of the air-blast passing through the nasal cavities, it seems to be as well as the morbid sensation which determines the expiratory act the result of deranged innervation. We can scarcely err in regarding the vaso-motor nerves as implicated in this occurrence, and that necessarily in the way of paralysis. How this comes to pass is not so clear by any means. Of course when an irritant as snuff is directly applied to the mucous surface we may consider that the tissue and the nerves are both directly affected, but this will not serve for the cases where no local irritant is applied, or where the local irritation is remote. I see no way of rendering a rationale of this common occurrence except by referring it to the theory of inhibitory action. The muco-watery profluvium is the result of reflex inhibitory irritation, congesting the vessels and promoting exudation. If, indeed, the profluvium were derived from any large gland, the reflected irritation might be supposed to affect this in the ordinary way, but as, in all probability, it is poured out from the general mucous surface this explanation will hardly apply. Another mode in which we can conceive the phenomena to be linked together is that some central change gives rise at one and the same time to the pain and the paralysis, each being expressive of a disorder of a similar kind in a particular kind of nerve. Romberg's case of facial neuralgia gives support to this view (v. p. 37, 'Syd. Soc. Trans.').

---

[1] 'Med. Times and Gaz.,' June 25th, 1869.

When there is no discoverable cause for the paroxysms the usual antineuralgic treatment is generally indicated. One of Romberg's cases was cured by carbonate of iron, and my own was very much benefited by iron and quinine with Fowler's solution. In a case referred to by Sir T. Watson plunging the head into cold water was found an effectual remedy. It probably cut short the fits, but does not seem to have prevented their recurrence.

Hiccup is described by Copland as consisting of a sudden and rapid contraction of the respiratory muscles, of the diaphragm especially. Romberg thinks this erroneous, and does not allow that irritation of the phrenic nerve is concerned in producing it. He bases this opinion on two cases recorded by Bright, in which organic disease affecting the right phrenic nerve produced other nervous disorder, but no hiccup. He ascribes its occurrence to reflex irritation, having its starting-point in the alimentary canal, the liver, or the uterus, but admits also that its cause not unfrequently resides in the central nervous organs. Copland states that it is often produced by locomotive biliary and renal calculi, as well as by strangulation of internal parts, and external injuries, and fractures of the ribs. It is not an uncommon and distressing symptom towards the fatal close of acute diseases and fevers, especially in advanced life. The form of hiccup which most concerns us here is that which constitutes, *per se*, the whole, or chief disorder, and is not merely symptomatic. This seems for the most part referable either to obscure nervous disorder, such as is loosely called hysterical, or to malarious infection. Of the latter a good instance is recorded by Widal ('Gaz. Méd. de l'Algérie'). The patient was admitted at first suffering under the consequences of cerebral congestion. Five or six days after having committed excess in drinking he was seized with violent hiccough, the incessant spasms of which compelled him to remain in bed, and resisted all treatment by anti-spasmodics. The hiccough was so intense and noisy, that it was heard outside the hospital. The number of diaphragmatic contractions reached 55 in the minute, and their energy was so great that all the muscles of the trunk participated in them. There was considerable dyspnœa, short inspirations, red face, white tongue, loathing of all kinds of food, pulse small, 80. Opii gr. $\frac{1}{3}$ was given every two hours, and a blister to the epigastrium was dressed with morphia, but no improvement ensued. The patient had no sleep, and his strength was failing. At last quinine in pretty full doses was given, which speedily put an end to the disorder, after it had lasted nineteen days. In all cases where the patient has ever been exposed to malaria we should consider whether this may not be the cause of the disorder. It is rather remarkable in the foregoing case that the neurosis was continuous, not periodic. Romberg mentions a case occasioned by a violent fright, in which the hiccup was complicated with, and alternated with attacks of spasm of the glottis. The patient was a female, æt. 21, with regular catamenia. I see no reason for denominating such a case hysterical any more than one of chorea produced as it often is in the same way. The seat of the disorder in both the above instances, and, indeed, in most, I believe to be central, though it is difficult to say precisely what nervous centre is affected. Probably, however, it is the upper part of the cord about the origin of the fourth cervical nerve. The causes which give rise to hiccup are most often of a debilitating kind, and there can be no question that the condition of the nervous centre is rather one of exhaustion than of increased energy. The affection may be viewed as a kind of local chorea, and, like it, is the result of abnormal excitability and weakness in the nervous tissue.

Very various treatment has succeeded in cases of non-malarious hiccough. In individuals exhausted by profuse discharges a full dose of opium is praised by Sydenham. In an opposite condition, viz. suppressed menstruation, Berends obtained a cure by taking three ounces of blood from the foot. Blisters to the neck are sometimes useful. Mental influences occasionally are potent remedies. Cruveilhier seems to have cured two bad cases by half drowning them with water poured down their throats. Swallowing lumps of ice, I think, would prove often an effectual remedy. Laennec was successful with milder measures in the form of magnetic (?) plates applied to the epigastrium and opposite region of the spine. Electricity, as it has proved beneficial in chorea, might be so also in this allied disorder. In some cases the interrupted, in others the continuous current might be suitable. The former should be used in cases where there was evident asthenia, the latter in those where there were indications of sthenic excitement. Dr. Salmon mentions an obstinate case of hiccup which had resisted for 5 days anti-spasmodics, stimulants, but was cured by 8 drops of Tilden's extract of Indian hemp given hourly for 5 hours ('Brit. Med. Journ.,' July 27th, 1867). Subcutaneous injection of opium or atropia might be used in many cases beneficially. Bromide of Potassium would be worth trial in cases characterised by nervous erethysm without much debility. Various stimulant and tonic medicines might be administered internally, according to the condition of the patient. One of the best is assafœtidæ gr. x in pil. ij, 2*dis horis sd.* The practitioner will do wisely in cases where the neurosis is idiopathic and obstinate to mingle with his treatment as much of the "medicina mentis" as possible. Nothing is more certain than that even actual bodily disorder is very materially influenced by mental affections, and this is eminently true of the neuroses.

Yawning is a small neurosis, which, however, has some points of interest for the thoughtful practitioner. Thus, though clearly a muscular *action,* it must be ascribed to diminution of nervous energy, and is thus a similar pathological instance to chorea and hiccough. Then it is unquestionably a communicative neurosis, and though of course we must take into account the circumstance that a number of individuals who are together are likely to be in the same state of fatigue, &c., yet it is certainly remarkable that witnessing this small spasm in a companion should cause others to imitate it involuntarily. One's thoughts of course recur to the communication of epilepsy in the same way, and one cannot but observe how in smaller as well as in greater matters our organism is swayed by the same rules. As these are communicated other neuroses may be so too, a circumstance which should make us not indifferent to the protection of the young and impressionable from sights which might affect them injuriously. Mothers firmly believe that squints are catching, and I am not sure that they are not right.

At any rate it is best to err on the side of safety. Romberg assigns to the uterus a large share in the production of yawning, and affirms consistently that it is much more frequent in the female than in the male sex. This I take leave to doubt, and am much more inclined to acquiesce in his admission that it may be of central origin, as is seen in apoplectic attacks. To my mind it is commonly of centric origin, at least when it results from fatigue, and betokens a state of temporary nervous exhaustion. It is worth observing that it is a common occurrence at the commencement of the cold stage of an ague, when nervous power is generally depressed.

If the principles I have laid down be correct *hæmoptysis* may be included among the neuroses of the respiratory organs. I would not be understood to affirm this in an exclusive manner, as if there were no other causes of this hæmorrhage; the only point I wish to maintain is that in certain cases, and these not very unfrequent, hæmoptysis may be reasonably regarded as a paralytic neurosis of the vaso-motor pulmonary nerves. In a fatal case of tuberculous hæmoptysis I could discover no special source of the profuse gush which destroyed life, it seemed as if the blood had escaped from the vessels everywhere. This is the general experience of others. When we look at a good specimen of injected lung, and at a thin slice of pulmonary tissue, we cannot but be struck on the one hand with the extreme vascularity of the air-cells, and on the other with the absence of support to the capillaries compared to those of other organs. In fact, one can hardly help wondering as a friend once remarked to me, that we don't all die of hæmoptysis. Having regard to these facts I cannot help thinking, in such a case as that just mentioned, that the blood escaped from the surface of the air-cells and not from that of the bronchi. The plexuses of the air-cells are exactly fitted to afford a sudden profuse gush, those of the bronchi are not. Such hæmoptysis as we are at present considering may result from severe muscular exertion. I have seen a large quantity of blood brought up by one of the crew of an eight-oar after hard pulling, and I know that the individual continued alive and well for years after. A friend tells me he has seen several such cases. For reasons which I have given it seems to me difficult to believe that the lungs were greatly congested in such patients, and I ascribe the hæmorrhage rather to the vaso-motor paresis induced by the consumption of nerve-force. The hæmoptysis which occurs sometimes in mountain ascents is probably produced in the same way. At very high altitudes muscular weakness is so great that talking becomes difficult. Trousseau relates the case of a lady who was subject when a child to somnambulism, and since then to the most "bizarre" nerve disorders. When about 30 years old she had such profuse attacks of hæmoptysis and so much dyspnœa that phthisis was suspected, though no physical sign could be detected. Till the menopausis occurred she often had alarming menorrhagia. At present her skin flushes very readily, but the above-mentioned symptoms have ceased, and she presents no sign of the presence of tubercles. Andral relates (p. 477) a fatal case of hæmoptysis, the lungs at the autopsy were found free from tubercles. The girl, æt. 21, had suffered for a year from violent palpitation, progressive loss of strength, and was put out of breath on the least exertion. These are common signs of a neurolytic condition.

In the following instance the nerve disorder seems to have been of inhibitory origin.

Case 17.—M. B—, æt. 28, admitted February 10th. Has been ill since last October, when she quickened and spit up then a great quantity of blood; the hæmoptysis went on to a considerable amount till the end of the pregnancy, though checked by medicine. She was confined 4 weeks ago, at the end of 7 months. Until she quickened she was very well. The hæmoptysis has occurred in all the 3 pregnancies she has had, and has come on in each at the time of quickening, attended with very bad cough; she thinks the cough brought on the hæmoptysis. Anasarca of the feet has occurred during the pregnancies, but at no other time; the legs, however, are rather swollen now. Abdomen contains a notable amount of fluid; it began to enlarge 7 days ago. Urine free from albumen, sp. gr. 1020, in fair quantity. A regurgitant mitral murmur is heard on auscultation, but there is no material hypertrophy or dilatation. Pulse regular and quiet. Mucous râles are heard in both lower backs, expectoration very moderate. The dyspnœa which she experiences is chiefly nocturnal, and is relieved by ether and opium. Under the use of iron and quinine this patient lost all her dropsy, both ascites and anasarca; the cardiac murmur either disappeared or was reduced to a minimum; she regained strength and became quite convalescent. All expectoration ceased, but some bronchial râle continued in the posterior parts of the lungs.

The hæmoptysis in this patient was due to inhibitory irritation proceeding from the uterus, which relaxed the pulmonary arterioles, and enfeebled the capillaries, so that blood escaped. The bronchial catarrh was produced in the same way, and so were the ascites and anasarca, the capillaries of the general system being affected in the same way as the pulmonary. The murmur may have depended on slight dilatation of the mitral orifice; I do not think there was any disease of the valve itself. Trousseau has seen, he says, females who, during the course of their pregnancy, or during the time of lactation, have had hæmoptysis which ceased with the pregnancy and the suckling, and could not be considered as symptomatic of the presence of tubercles, or of organic lesion of the heart. He gives a well-marked case of copious hæmoptysis occurring in an anæmic female, exhausted by lactation. This woman had no physical sign of phthisis, and recovered completely. Here the hæmorrhage must be referred to direct vaso-motor paresis.

Among the recognised remedies for hæmoptysis there are three which plainly seem to operate through the vaso-motor nerves. These are Ergot, which is strongly recommended by Dr. Dobell, Ice to the chest, and the production of vomiting.

The production of cough by remote irritation should have been alluded to. Graves' well-known case where the presence of a tænia in the intestines, and Mr. Toynbee's, where a piece of dead bone in the auditory canal gave rise to severe intractable cough, are good examples. Dr. Cornelius Fox's paper on Ear-cough (v. 'B. M. J.,' 1869, Dec. 18th) is well worth perusal.

LEEDS SCHOOL OF MEDICINE

CHAPTER XLI.

GRAVES' DISEASE.

The following history of a severe case under my care may serve as an introduction to this chapter.

Case 1.—C. B—, female, æt. 40, dressmaker, seen February 2nd, 1859. She was an in-patient in St. Mary's, under Dr. Markham's care, who kindly transferred her to me. She was in a state of extreme debility and great emaciation, but not anæmic, could not lie down. There was marked proptosis, the eyeballs could only be partially covered by the lids. The thyroid gland was greatly enlarged, the middle and right lobes chiefly. Purring thrill was felt in the superior thyroid artery of the right side. The enlarged gland seemed to press on the trachea, and to occasion the orthopnœa and cough, which distressed her a good deal. Her condition was so grave that the question of tying the thyroideal arteries had been considered. Heart not enlarged, its sounds normal, except a soft, systolic bruit at the base. She had great palpitation, which disturbed her even at night, and extended up to the neck. On examination of the chest more particularly ten days later no dulness was found, but the breath-sound was extremely weak, the movements frequent and shallow. Bronchial breathing was, however, audible over the upper part of the sternum, owing, probably, to pressure made by the thyroid upon the trachea. Pulse 111, soft and weak. Appetite good until lately, food has made her sick the last 10 days. Tongue natural. Bowels regular. No catamenia for 8 months. She has taken Iodine and Potass. Iodid., and applied Ungt. Hydr. Iod. to the thyroid without any benefit. Leeches to the part have given great relief, but only for a day or two. She has been suffering as at present for 6 months, but her disorder has been coming on 4 years. The goitre appeared first about the end of 1856, after some extra anxiety. The swelling came on suddenly, but did not enlarge much for one year. About 12 months before her admission into the hospital the tumour enlarged much, and cough set in. The chief cause of her prostration and debility seemed to have been her working day and night in the endeavour to support a relative who was dependent upon her. She continued in the hospital under my care till about March 26th, when she was made out-patient, considerably improved. She slept well and lay down at night, took food fairly and had gained strength. The goitre had not diminished materially, but distressed her much less; the proptosis continued. For about fourteen days after she came under my care she suffered very much from coughing and vomiting at night, with diarrhœa every now and then. Some nights were much quieter, and then again she would have very bad ones. The urine, before notable amendment had taken place, was of very deep colour, sp. gr. 1018, clear, not albuminous. After she had improved it was extremely pale, sp. gr. 1011, feebly acid, cloudy from diffused mucus. She derived great benefit from the frequent application of ice to the thyroid; it certainly seemed to check its enlargement. Strychnine and quinine were given at first, but without advantage; the cough and vomiting were uncontrolled. Opium at night, and in smaller doses during the day, did not appear to be of much advantage, except in quieting the diarrhœa. On the other hand, nitrate of silver and hydrocyanic acid appeared really to be of efficacy in calming the irritability of the mucous membranes. After this had been accomplished she began to take quinine gr. i + tannini gr. iv + opii, gr. i in two pills *ter die*, and continued the same till the beginning of August. Ammonia and valerian, and afterwards citrate of iron and quinine, were also given. In May and June I tried the administration of tincture of ergot, and of liquor calcii chloridi, in the hope of reducing the size of the thyroid, but without any success. On one occasion I injected ♏x of solution of perchloride of iron into the tumour, but the effects deterred me from repeating it. Her head appeared to her to be on the point of bursting; she lost all vision for a short time, and lapsed into a state of semi-syncope, in which she remained about a quarter of an hour. There was no hysteria in the matter nor was it the effect of fright. During August she was at the Convalescent Asylum at Walton, where she improved decidedly; and immediately after she went to work in a lady's family at Deal, whence she returned in the beginning of October, looking very well, and, as she declared, with such an appetite that she was ashamed of it. The goitre was unchanged, but the proptosis had disappeared, she could close her eyelids completely. She had gained a good deal of flesh, and felt as well as ever she did, except that her breath was short on ascending a hill, or going up-stairs.

After this I saw no more of her till May 5th, 1860, when I was urgently requested to take charge of her. She had overworked herself again to provide for some relatives, and had gradually got much worse. I found her in bed with a very flushed, red, anxious face, extreme agitation, breathlessness, muscular tremor, and debility, but no delirium; her stomach very irritable, rejecting all food, her bowels relaxed; no sleep; pulse rapid and tense (about 100); breathing in lungs clear and free. Opii gr. i *2dis horis*, milk and beef tea in teaspoonfuls half hourly, and perfect quiet. On 6th she had had no sleep, but on 7th I found she had slept 4 hours, and was much better after it, but had become worse again. Pt., and to take rum and milk. On 10th she reported that the previous night had been excellent, and that she felt greatly better; the night before she had 4 or 5 hours' sleep, stomach quiet, no desire for food. The opium during the last 2 days had been taken *3tiis horis*. On the

24th the stomach remained very weak and irritable, she often had vomiting, sometimes great palpitation; she could only take Oswego corn, beef tea, and milk. A severe attack of pain at epigastrium and dyspnœa, lasting about $\frac{3}{4}$ hour, occurred 3 days ago, none since. Slept very well, but was very weak. Opium taken every 2 or 3 hours. June 2nd.—She was very prostrate, and her stomach very sick again, she could not raise herself in bed. I ordered Strychniæ gr. $\frac{1}{16}$ *ter die.* 6th.—Very much better, sitting up on the side of her bed dressed, stomach quieter. 22nd.—Gone to Walton, appetite very good before she left. October 25th.—Is in good health, no proptosis, the goitre remains *in statu quo.*

The aphorism as to the necessity for "tempestivus usus" of remedies finds an illustration here; the strychnia and opium, which were of little or no avail on the first occasion, proving very serviceable on the second.

I now proceed with a *résumé* of the symptoms, pathology, and treatment. The three chief symptoms of the malady in question were well marked in the case I have related, as well as a fourth, which is not often absent. Proptosis, thyroideal enlargement, and palpitation, constitute the characteristic phenomena of the fully developed disease, and they seldom are present in a marked manner without being attended by considerable debility and exhaustion. Other less prominent and constant symptoms are hæmorrhages, diarrhœa, emaciation, elevation of temperature, disorders of vision, mental excitement, insomnia, tendency to suffocation. In some cases the disorder is "frust," to borrow Trousseau's phrase, *i.e.*, one or more of the three chief symptoms is awanting. The patients are often anæmic, but Teissier has recorded 4 cases in which there was no deficiency of red blood, or of flesh, or strength. The malady is much more frequent in females than in males. It does not commonly prove fatal, but a tolerable number of autopsies are on record. Its course may be quick, or chronic, usually the latter. Thus much may serve for a general account. We may next consider the mode of origin of the several symptoms.

(1) The Proptosis may probably be due to various causes. Dr. Fletcher follows several former writers in attributing it to distension of the intra-orbital vessels, and adduces in support of this view the facts of pressure reducing the exophthalmus, and the disappearance of the latter after death. Fano noticed in one case that pressure on the eye caused the upper lid to be bulged by voluminous veins. Trousseau affirms that in a great number of cases the proptosis may manifest itself rapidly in a paroxysm of disorder, and subsequently disappear more or less completely, and thinks this can only be attributed to an active and violent congestion. He gives, however, the

details of a fatal case where the eyes were pressed out of the orbits by an enormous hypertrophy of the adipose tissue, and cites 3 or 4 similar instances from Withusen. In a case of similar nature related in this work (v. p. 529), the cause of the proptosis was hypertrophy and œdematous infiltration of the cellular tissue of the orbits. The eyes are sometimes so displaced that their equator falls outside the margins of the lids. Occasionally, as in a case recorded by Dr. Bäumler, the corneæ become opaque and ulcerated, and there is much conjunctival chemosis. This, however, is a rare event; Trousseau has never seen it, and Dr. Stokes states that he has known the eye for upwards of a year to be never closed, yet no vascularity of the conjunctiva, nor any form of ophthalmia, ever occurred. The retinal vessels are sometimes congested, and occasionally pigment deposits, or numerous small extravasations are met with. In some exceptional cases the vision is affected, the patients become presbyopic or myopic, or have black spots before their eyes, or see fiery circles when their eyes are closed.

(2) The Thyroideal enlargement is usually gradual, but may come on very rapidly, and attain such a size as to compress the trachea, and interfere with the admission of air. The proper tissue of the gland is hypertrophied, as well as, in some instances, the connective tissue. Trousseau refers to a case in which the indurated fibrous tissue had consecutively induced atrophy, just as in cirrhosis of the liver. Distension and enlargement of the vessels contributes materially to the swelling, the throbbing expansion is sometimes so great that the right lobe has been mistaken for an aneurysmal sac. Purring thrill may be felt in the arteries, and single or double bruits heard on auscultation.

(3) Excitement of the heart's action is a very marked and constant symptom, so much so that Dr. Stokes makes the essence of the disease to consist in functional disturbance of the organ, which may be followed by organic change. The amount of this disturbance varies much; I think I can be sure that it is not at all greater in some cases of this malady than in many instances of ordinary anæmic palpitation. The heart's sounds may be simply loud, or there may be inorganic bruit heard at the base, and propagated along the large arteries. In some cases, the heart is hypertrophied and dilated, but it seems to me certain that this is not necessary, as Aran considered. Cases of hypertrophy and dilatation are common enough in which the characteristic symptoms do not occur.

(4) *Impairment of nervous power* generally becomes very marked as the disease advances. In a large number of instances, however, debility exists at the commencement, either as the result of some shock or strain to the nervous system, or without apparent cause. Dr. Stokes says that in young women mental anxiety and terror may produce the disease; in one male whom he alludes to long-continued hæmorrhage from piles was assigned as the cause. Mental emotion and hard work were the immediate precursors of the malady in Dr. Bäumler's case; in my own the influence of excessive fatigue was very evident. In 5 of Dr. Fletcher's cases the health had been injured by overwork, want of rest, or anxiety, and in one the patient had always been delicate, feeble and stunted. In Dr. Parry's second case a fright was the cause, and also in one of Trousseau's. The latter mentions fatigue and grief and neuralgia as precursors in two other cases. There are, however, cases recorded in which the disorder seems to have commenced in the midst of apparently good health, and, on the other hand, it is, of course, quite certain that great nervous prostration does not necessarily give rise to it. There must, therefore, be some peculiar derangement.

(5) The occurrence of *hæmorrhage* has been observed in several instances. Dr. Stokes and Trousseau each mention a case of extravasation into the substance of the brain. The latter writer tells us that the vessels in the affected part, when microscopically examined, were not found diseased. One of Trousseau's cases shows very strikingly the connection of this symptom with the others. A female, æt. 53, who had been much fatigued in attending on her father during his fatal illness, while weeping during the night felt all at once that her eyes swelled and raised up the lids, that her thyroid gland increased much in size, and pulsated in an unusual manner, and that her heart palpitated strongly. At the same time copious epistaxis came on, and lasted all the night. Four days later the proptosis was very evident. Trousseau remarks with reference to this case, of all morbid accidents congestion alone is capable of being produced so rapidly, and as if to prove that a multiple congestion occurred, copious hæmorrhage from the nose took place coincidently with the other symptoms, *i. e.* there was at the same time congestion of the pituitary membrane. It seems to me that congestion alone is insufficient to account for the occurrence of hæmorrhage, and that we must admit in cases of this kind that the capillaries become actually altered under the influence of the cause

which creates the congestion, otherwise we should have simple tumefaction of the membrane, as in common catarrh, but no hæmorrhage. In fact, we have here another example of loss of retentive power in capillaries coinciding with paralytic dilatation of arteries.

(6) *Profluvia from mucous surfaces,* lacrymation, diarrhœa, vomiting, are symptoms of the same character and significance as hæmorrhage, but are much more frequently met with. In Dr. Bäumler's case the lacrymation was so copious that the patient's pillow was quite wet in the morning. Œdema of the extremities is another symptom of the same class.

(7) The *alterations in the character,* says Trousseau, are such that the patients' attendants have a hard time of it, the sufferers being irascible, ungrateful, and "exigeant" to a degree. He mentions the case of a young girl, usually of a gentle disposition, who became excited, disrespectful, and almost violent. In Dr. Baumler's case the patient at an advanced period of his malady was semi-maniacal, fancied himself persecuted, and struck his attendants. Insomnia is of frequent occurrence, and persists obstinately; it distresses the patient very much, as we may gather from Dr. Fletcher's account of one of his cases, who went to bed with the fixed impression he would not get an hour's sleep, and arose in the morning fretful, irritable, morbidly anxious, and worse than he had been the day before. In a case under Dr. Morell Mackenzie's care the patient had about a week before her death two attacks of epileptiform convulsions, and several maniacal paroxysms. In the intervals she was semi-comatose. She had not suffered so far as appears from epilepsy before ('Clin. Soc. Trans.,' 1868).

(8) *Increase of temperature* has often been noted by M. Tessier to the extent of 1·8° or 3·6° F. I have not found the point noticed by other observers, but it is one of very great importance to the theory of the disease, and should never be omitted.

(9) The *emaciation* which is pretty constant in severe cases is sufficiently accounted for by the distress, vomiting, diarrhœa, and anorexia.

(10) In my case the condition of the urine during the acme of the disease was very noteworthy, especially as compared with its state during convalescence. The deep red colour of the earlier period indicated the great waste of red globules that was taking place in the blood, and was quite homologous to that which is observed in low fever, and the hectic of tuberculosis. Its subse-

quent pallor corresponded also to that of the stage of recovery from acute diseases. The resemblance to pyrexia or fever is marked very much by these features.

(11) The pulse is in most cases much accelerated, sometimes 150 or 170, and there is often a striking difference between the forcibly throbbing carotid and the weak and small radial. In Dr. Bäumler's case venous pulse was observed at first in the veins of the neck, and afterward in the veins of the hand or arm. The abdominal aorta pulsated very strongly.

The changes discovered in the *autopsies* which have been made with few exceptions afford little explanation of the phenomena observed during life. The disorder is evidently a neurosis, and most of the coarser changes found must be regarded as secondary. In one, however, of Trousseau's cases the cervical sympathetic ganglia were minutely examined, and the inferior, especially on the right side, was notably abnormal. It was much larger and redder than usual, contained an abundance of fibrous tissue and vessels, but its nerve-cells were much atrophied. Dr. Reith has published a case (v. 'Med. T. and Gaz.,' 1865, Vol. II, p. 522) in which the cervical sympathetic was found diseased. On the left side the trunk of the nerve and its two upper ganglia were considerably enlarged, while the inferior ganglion was not only enlarged, but hardened, so as to feel like cartilage. On the right side the nerve preserved its original appearance, but its inferior ganglion was in a similar condition to that of the left side. In addition the cellular tissue surrounding each inferior ganglion was thickened and hardened. The microscopical appearances were far from decided, the only thing noteworthy being condensation of the ganglion cells with an immense quantity of granular matter. Dr. Reith justly observes, I think, that as there was extensive tubercular infiltration in the cellular tissue of the neck, as there was enlargement of the cervical glands, and as the neck from ear to ear was covered with scrofulous cicatrices, the assumption is warranted that the ganglia of the sympathetic were involved in a similar manner.

On the other hand, Geigel (v. 'Wurzb. Ztschr.,' VII, p. 70) relates a case in which a very careful dissection and microscopic examination failed to discover important alterations in the different organs. Fournier, also, states that he made a careful microscopic examination of the sympathetic in a fatal case without finding any trace of morbid alteration. The heart was quite healthy ('Gaz. Hebdomad.,' No. 49, 1867).

There seems no reason to doubt the correctness of both these sets of observations. It is quite possible that the nerve disorder may be functional in some cases, organic in others.

From the above facts we have now to construct a rational theory of the disease. The violent throbbing of the carotids, the evident hyperæmia of the thyroid, and in some instances of the face and eyes, point very decidedly to a loss of contractility in the arteries of the parts affected. As the malady is often evidently dependent on general failure of nerve power, and as the temperature is elevated (supposing this to be constant in all cases), there seems a good deal of ground for attributing the arterial relaxation to vaso-motor nerve paresis. That the cerebral arteries are affected in the same way as the thyroideal may be inferred from the mental excitement and anxiety, the insomnia, the occasional occurrence of a maniacal condition, and of actual extravasation in the brain. The diarrhœa which so often wastes the patient may also reasonably be referred to relative increase of intra-vascular pressure, as well as to decrease of retentive power in the smaller vessels. Though the arteries of the upper parts of the body—those nearest to the heart—are most affected, yet, as the abdominal aorta sometimes pulsates strongly, it is not improbable that some of its branches may be in a similar state of paralytic relaxation. The quickened and excited action of the heart may be explained by assuming that the cardiac branches of the vagi are paralysed just as the vaso-motor are. The proptosis may be caused by intra-orbital hyperæmia, or its results in the form of serous infiltration, or by some adipose hypertrophy.

The circumstance that the enlarged thyroid or its right lobe has throbbed so forcibly as to mislead surgeons into the idea that they had to deal with an aneurism is very significant as to the dilatation which must have taken place in the vessels, and is explicable on the same principle that Dr. Stokes has applied to the case of the violent pulsation of an aneurism—viz. that the diameter of the reservoir into which even a small stream of fluid is introduced multiplies greatly the force of the entering current. There can be no doubt that as the vessels yield to the intra-vascular pressure, and present in consequence more surface for this to operate on, the distending force must be proportionately increased, probably in a very accelerating ratio. It forms, I think, no objection to the above view of the pathology of the disease that it is common to observe very marked throbbing of the carotids without any such phenomena ensuing as are observed in Graves' disease. This is quite true, but we have no proof that in these cases the small arteries and capillaries are relaxed which have, of course, most to do with the production of local hyperæmias and enlargements. That the disorder specially affects the upper part of the body is readily accounted for by its proximity to the heart, and the consequent greater force of the circulating current. The same explanation applies to the copious sweating of the head and neck which is so common in rickets, and in sundry other states in which nerve prostration is a marked feature. The much greater facility with which injected material makes its way into the vessels of the head than into those of the lower limbs when thrown into the aorta is well known to demonstrators of anatomy. The positive influence of malaria in producing goitre may be referred to as another proof of the correctness of the view I have taken. Malaria is a powerful cause of paralytic pyrexia, and this affecting the thyroid causes its enlargement. In Graves' disease the morbific agent is different, but the results—the goitre and ague cake—are very similar.

The object of treatment must evidently be (supposing our pathology correct) to restore tone and force to the nerves and vessels. In cases of urgency where suffocation is imminent, depletion may be requisite, and may be accomplished either by leeching the vicinity of the thyroid, or, what would be more effectual, opening one of the large veins leading from the gland. The continuous application of an icebag over the tumour in such cases is always advisable, and Trousseau has seen great benefit from the administration of Tr. Digitalis. He advises it to be given to the verge of producing toxic symptoms in hourly doses of ♏viij—♏x. The three remedies now mentioned rapidly restored a youth who was for some time in such peril of asphyxia from pressure on the trachea that all was kept in readiness for the performance of tracheotomy (v. 'Clin. Med.,' Vol. II, p. 477).

In cases of a more chronic kind chalybeates are undoubtedly often very beneficial. Dr. C. J. B. Williams prefers the astringent preparations, and gives them in large doses. There are, however, many cases in which they are not well borne. Trousseau rejects iron as injurious, and quotes Gräfe's statement that it ought not to be administered when the pulse exceeds 110. Digitalis given at a moderate rate may be very suitable to cases which are intolerant of iron. Dr. Stokes mentions in one of his cases that the long-continued use of digitalis with anodynes at night coincided with very great improvement and ultimate recovery. Opium may be given to individuals with whom it does not disagree in full or large doses with decidedly good effect. In the case I have related I believe it prepared the way on the second occasion for strychnia, which completed the cure. The latter would probably have been too stimulating if given at first, just as it was when I tried it during the first attack. Subcutaneous injection would probably be the most efficient mode of administering opium for the purpose of arresting cough and vomiting, and enemata might be most suitable to stay diarrhœa. Other useful sedatives would be Indian hemp, chlorodyne, or ice-lumps swallowed. Tannin with Glycerine or Muriatic acid, given, perhaps, in very large doses, or similar preparations, such as tincture of Ashantee bark, or Red Gum, are remedies which might avail in certain cases, as where Iron and Digitalis disagreed. Ergot is another remedy which might on rational grounds be expected to be useful. It was of no benefit, however, in one instance where I gave it.

As the female patients, who form the great majority, are usually amenorrhœal, it is certainly desirable to endeavour to restore the uterine function, but I do not think it would be advisable to press this indication too rudely. Warm hip-baths at the proper periods, vaginal injections of liquor ammoniæ, and some doses of Apiol a few days before the usual date of the flow, are all the remedies of this kind I should care to have recourse to. Hydropathic treatment judiciously applied has sometimes succeeded very well. Trousseau speaks very favorably of it in cases attended with amenorrhœa.

If, though we cannot ascertain this during life, there be actual degeneration of the sympathetic nerve, the case is probably hopeless. In Dr. Bäumler's case, which I saw with him, the state of the circulation reminded me very much of a watch whose chain has snapped, and the hands are hurrying round the dial until they come to a final standstill.

LEEDS SCHOOL OF MEDICINE

CHAPTER XLII.

ABDOMINAL NEUROSES.

It is difficult to give a general description of the above neuroses, and if it were more easy it would still, I think, be more practically useful to cite examples of various kinds. The first group I present comprehends cases of what may be best termed abdominal neuralgia. The term is vague, but, for that very reason, preferable to others, which might not be applicable to all the cases I wish to include. While I shall show that differences exist which are of much importance to treatment, I wish especially to keep in view the main feature of the disorder. As will be seen, I exclude from the above group cases of lead colic.

Case 1.—J. B—, æt. 14, male, pupil teacher, intellectual looking, and delicate; worked rather hard in a school. Admitted January 28th, having been ill 3 days. Has pain in abdomen, causing him to bend double at times; some cough and pain in the chest; food causes no pain. Abdomen somewhat tender to pressure, the pain in it ceases when he is recumbent. I urged his being removed from school, as the confinement was evidently injurious; but this was not done. Citrate of iron and quinine, with a little potass. iodid. and chloric ether, was given for 14 days without advantage. Subsequently he took a combination of ammon. carb., ferri ammon. citr., tr. nucis vom. and infus. calumb., with which he benefited immediately, and was discharged well by the end of April.

Case 2.—J. N—, male, æt. 13, admitted June 4th. Ill two days. Was attacked while at work with pain in abdomen and violent sickness and purging. These have ceased, but the pain continues, and there is considerable tenderness on pressure over the umbilical region, but not elsewhere. Pulse small, 100. Tongue slightly furred. Pupils of medium size. Has had a dose of ol. ricini. Although I have had an eye to detect abdominal neuralgia for some length of time, I doubted seriously in this case what was the exact state of matters. The boy had walked to the hospital, and his aspect was scarcely that of a person affected with peritonitis. Yet the tenderness was so marked, and there was such an absence of hysterical exaggeration, that I was fearful of treating the disorder as mere neuralgia. So I gave him then and there tr. opii ♏xxx in an enema, and after he had lain still awhile and seemed freer from pain I ordered him pil. saponis co. gr. v. *3tiis horis* vel *4tis horis.* 8th.—Apyretic; has still much abdominal pain, but some appetite. The course was now clear, I gave him ferri et quinæ citratis gr. vij *ter die,* and in fourteen days he was almost well, ailing only with great debility.

Case 3.—G. E—, æt. 13, male, admitted November 21st. Ill three months. Has frequently violent pain in his bowels, "and is all drawed up into a lump." Flinches very much from pressure on abdomen. When lying down the recti muscles are very tense, but when his attention is distracted he lets me manipulate his abdomen without much complaint. Has "cold shivers" when the pains are present. Bowels open, has pain when they act. Has taken his food pretty well till last two days. Very languid and drowsy. Has been under medical care, and been salivated for supposed inflammation of bowels. I gave him at first citrate of iron and quinine, *ter die,* and lin. opii; from this in a week he was little if at all better; it was then changed for muriate of ammonia, gr. x *ter die,* but without any advantage; the paroxysms of pain lasted from ten to sixty minutes. He then had ferri carb. saccharati gr. xv vel xx *ter die.* This was of material service; but still the enemy was not quelled, the pain reappearing two or three times a day. A bismuth mixture, with hydrocyanic acid given along with the iron, only caused sickness, and I was beginning to get disheartened, and to suspect malingering, when at last I prescribed pot. iodid. gr. jss *ter die*, continuing the iron, and in a fortnight he was quite well.

Case 4.—H. H—, male, æt. 13, admitted March 19th. Has been laid up two months. Looks very healthy. Tongue clean. Bowels open. Has pain in abdomen commencing in the region of the cæcum, and following pretty regularly the course of the transverse and descending colon. He describes the pain as "wretched agony," lasting five to fifteen minutes. His father thought he would have died some days ago. Exertion brings on the pain, is not attacked nearly so much at night when lying still. Has been blistered without benefit. Skin cool. Pulse weak. Citrate of iron and quinine and spt. æth. s. co. did good, but was not nearly so efficient as muriate of ammonia with bark, on which he improved so much that he was nearly well when he ceased attendance a month later.

Case 5.—J. G—, female, æt. 23, admitted March 26th. Ill three days with severe pain all over lower part of abdomen and extending to back, not relieved in bed. Pain increased when bowels act. Abdomen not swollen. Catamenia just ceased, lasted only two days. Not anæmic. Tongue clean, moist. The pain was very much like that of limited peritonitis, but not so much influenced by pressure. I injected liq. opii sed. ♏x into the hypogastrium subcutaneously, ordered an opiate liniment, and pil. saponis co. gr. v., *ter die.* 30th.—Was very much relieved by the injection, "it seemed to expand her stomach and remove the pain." Catamenia returned and continued three days. Bowels confined. Urine much paler. Pulse very feeble. With ferri and quin. citr. + chloric æther she improved materially and soon ceased attendance.

Case 6.—Mrs. A—, elderly, fat, with large abdomen, had suffered with a bronchial attack, attended with very great prostration during 2 months before I saw her. She had been getting about again, when, at 4 a.m. November 25th, she was attacked with severe pain in the left lower part of abdomen. This did not last above an hour; but the next night it returned nearly at the same time, and was exceedingly severe for many hours. I saw her at 3 p.m., when the pain had just gone off altogether, and the relief was so great that she could hardly describe it. The pain spread about a good deal, and made her feel very faint. After it had gone off there was no tenderness or uneasiness at all, nor anything at all abnormal in the abdomen, which was lax and soft. Pulse 87, of fair force. Skin cool. Tongue clean. Bowels not open 2 days. I advised quinine in gr. v doses twice or thrice that evening, and afterwards at a moderate rate, with food and stimulants. December 4th.—She is doing well, has had no return of the neuralgia.

Remarks.—It may be observed that the subjects of most of the above cases were boys, who probably have less tendency to hypochondriacal exaggeration than most persons. Nevertheless, I must confess that on two or three occasions I was much inclined to suspect the patient's honesty until the speedy success of a particular remedy proved that it was my skill that was defective, and not his "morale." In none of the cases related did the neuralgia appear to be referable to lead, the gums showed no traces of blue line (my notes mention this specially in three). The periodicity in the last case is rather indicative of malarious taint, which may have been derived from the locality, a metropolitan suburb, or from the preceding influenzal bronchitis. Sir H. Holland has noticed such sequelæ. The limitation of the disorder to one part of the abdomen is noteworthy. One very practical point which the above histories illustrate is the different quality of the morbid action in different cases which appear very much alike, and the great difficulty there may be in selecting the right remedy in any given instance. Where pot. iod. succeeds we may regard the aponeuroses as most affected, where muriate of ammonia avails the muscular fibres, and where iron and quinine carry the day, we may consider that the neuralgia is more of a simple than rheumatic character. This knowledge after the event does not avail us, however, before it, and I believe it will often be necessary to have recourse to trial, which, however, need not generally be prolonged. It would be easy to indicate points, as the state of the urine, the previous history, the effect of moving about, which might serve as aids in diagnosis, but I believe they are unreliable. Increase of pain, for instance, on moving, which would be a sign of muscular rheumatism, might easily be present in fibrous. Pale and low sp. gr. urine would certainly indicate most probably simple neuralgia, but lateritious urine would be no certain sign of rheumatic disorder. As to the exact locality of this neuralgia, it seems to me that we may agree with Romberg in referring it, in many instances, to the superior mesenteric plexus and its ramifications. From the neuroses which are so definitely referred to the epigastrium, and which probably have their seat in the solar plexus, it is certainly distinct. In the case where subcutaneous injection acted so efficiently, it may be thought that the disorder was seated in the anterior parietes of the abdomen, but I doubt whether this is sufficient ground for the opinion, as in another instance a severe and well-marked gastralgia was relieved equally well by the same means. The relation of this disorder to common neuralgia in other situations is marked by its being associated almost invariably with general debility, by its being cured by the same remedies, and by its occurring occasionally as a result of malarioid fever in children. To genuine hysteria I do not think this disorder has much affinity. The most refractory case I have had was that of a female, æt. 50, who had had 18 children, and suckled 17 of them 9 or 10 months. Here was cause enough for nerve-exhaustion.

That the affection now described is not well known in the profession seems pretty clear from the history of a case recorded in the 'Brit. Med. Journ.,' July 16th, 1859. A boy, æt. 10, tall and active, suffered with attacks of pain in the bowels, which had become gradually longer and more severe. The abdomen felt sore, and bore pressure well, when pain was absent, but the least touch was intolerable, and all the surface of the body was preternaturally sensitive when the pain was present. When the attack began to come on he appeared frightened, and threw himself on the ground, writhing to and fro in great agony; the pulse became very rapid, and the face covered with profuse perspiration. The pain seemed to begin in the cœliac plexus of nerves, and to shoot into all the abdominal viscera, and to the region of the heart. A London physician who was consulted thought that the disorder might depend on lead-poisoning, and prescribed alum and change of air. These and much other treatment failed, until, at last, ferri carb. was given, which cured the disease.

The two following instances, as well as two preceding, are worth recording as showing the resemblance which the disorder may present to peritonitis.

Case 7.—E. J—, æt. 33, married, 3 confinements, admitted May 7th, 1868. Ill 3 weeks, was taken first with sickness, pain in left side over lower ribs, pain in back and epigastrium. The pain has continued, but has been relieved by 4 leeches applied just now, the bites of which are bleeding freely. The pain gets easier occasionally for a little while, but soon returns on exertion. Some indigestion and constipation. No appetite, thirst. Urine very thick and dark. Pulse 100, weak. Temperature 99·3°. Is very weak. No cough, no dyspnœa, no eruption. Tr. Opii ♏25 in an enema were administered, and Ferri Carb. Saccht. gr. xx prescribed *ter die*. 9th.—Scarcely any pain, abdomen bears handling well, urine palish. Temperature 97·5°. Pulse 100. Mist. Quinæ ℥j *bis die*. 18th.—Discharged well.

Case 8.—E. G—, æt. 36, needlewoman, admitted December 6th, 1867. Was at first ill with menorrhagia, and took cold 5 weeks ago, was seen by a competent observer, who states that her abdomen was very tender on pressure, and tympanitic; she had pyrexia, and loaded scanty urine. She was treated with Opii gr. ½ 4*tis horis*, and linimentum. Terebinth c̄ Opio to the abdomen. Has been in bed 5 weeks. During that time has had violent pains all over abdomen, with sickness and constipation. On examination I find that she has much tenderness and pain at left side of abdomen, there is no dulness or distension, and the parietes are lax and soft. The pain some time ago was on the right side of the abdomen near the flank, just opposite its present site. Some days later she affirmed that the pain she had at this time was just the same kind of pain she had before. She had been very sleepless and restless at night all the time she had been ill, and had been badly off. Complexion sallow. She was ordered Liq. Opii Sedat. ♏25 in enema, and Ferri et Quin. Citrat. gr. 8 + Spt. Æth. Chl. ♏x + Aq. ℥j *ter die*. The next day the pain was relieved, the tongue clean and moist, the pulse 82, weak, the heart and breath sounds were normal, the urine sp. gr. 1012, not albuminous, of normal colour. Profuse perspiration frequently broke out all over her. 9th.—Pain much relieved, comes on badly between 1 and 2 a.m., as it always had, "very violently." On 11th, Ammonia, with Decoction and Tincture of Bark, was substituted for the Citrate of Iron and Quinine, which purged her much, 8 or 9 times a day. On 17th some cod-liver oil was ordered; she had subsequently no complaint, except of weakness, and went out finally in very fair case, January 8th.

The first of these cases was evidently purely neuralgic, but seems to have commenced like the second with gastric catarrh; the state of the urine was misleading as well as the thirst. The second *may* have been attended with peritonitis at its outset, the pyrexia, loaded scanty urine, abdominal tenderness and tympanites, sickness, with constipation, look very like it, but I am rather inclined to suspect that the pain from the first was neuralgic, and the pyrexia that of malarioid fever for the following reasons. The pain which she had before her admission was she stated of the same kind as that which she had while in the hospital, which was plainly neuralgic. Though the pain continued there was no evidence of effusion into the peritoneum. The pain was aggravated periodically, and that at night. It shifted its situation, and was cured by rest, opiates, and tonics. The pulse was only 82. She was in a very weakly state, and had been debilitated by menorrhagia. Though the two conditions of neuralgia, or hyperæsthesia, and inflammation, are widely different, there seems to me no improbability that the one may pass into the other. In fact, we have seen that this actually occurs in some instances of cutaneous neuralgia, and is, therefore, even more likely to befal the peritoneum. Sir T. Watson speaks of the tendency of neglected colic to run into actual inflammation. I would not, therefore, in dealing with abdominal neuralgia, even when I was quite satisfied that it was not symptomatic of obstruction, or any such cause, put aside altogether the possibility of its passing into peritonitis, or being complicated with it. When we doubt, as we sometimes can hardly help doing, the diagnostic features of the neuralgic state, which are our most reliable guides, are the non-elevation of the pulse and temperature, the patient writhing and twisting about instead of maintaining a fixed position, the occurrence of intermissions, and the absence of any tendency to distension of the abdomen, or to dulness from effusion in the dependent parts. The value of these features was well exemplified in a case which recently misled me for a time.

The following case may very well find its place here, as having a close relation to the preceding, especially as regards the risks of supervening inflammation.

Case 9.—F. A. K—, æt. 29, painter, admitted June 13th, 1868. Ill 3 days, before that was well. Complains of violent pain in his abdomen cutting him like a knife. His belly is very tender, even to light pressure, the recti muscles are constantly twitching on the least contact, or even without it. Pinching a fold of the skin of the abdomen causes pain, but the same treatment of the skin of the thorax does not. Right hand trembles. Gums are swelled and reddish, but show no blue line, the necks of the teeth, however, are very dirty. Bowels opened by oil this morning. Says that he cannot stand, has no use of his legs. Pulse 80, weak. No appetite. Much thirst. Breath and heart sounds normal. Temperature 100°. Urine sp. gr. 1020, not albuminous. The present is his 5th attack of colic. He was injected subcutaneously with Liq. Opii Sedat. ♏x, and ordered Aluminis gr. x + Magnes. Sulph. ʒj + Extr. Bellad. gr. $\frac{1}{4}$ + Spt. Æth. Chlor. ♏x + Aq. ℥j 3*tis horis.* 15th.—Pain gone from abdomen. Bowels open. Abdominal muscles lax. 17th.—Quite convalescent, went out soon after. He was readmitted November 28th, 1868, having been ill 3 days with severe pain across the abdomen, and in all his joints. Pulse was 72, of good force. Wrists dropped. He had vomited a teacupful of blood a week before. The same treatment was put in force, but on 30th he was trembling, and shivery, sleepless, was thirsty, vomited, and took no food. His pulse was 105, weak, his Temperature 99°. Respiration 50. The heart and lung sounds were normal. He was in great distress and felt ill all over. Urine clear, not albuminous, sp. gr. 1014. The abdomen was extremely tender, especially near the epigastrium, not at all contracted, not dull on percussion at any part. Bowels acted loosely yesterday. He was immediately put into a warm bath, which he found very comfortable, and ordered Opii gr. j 2*dis horis.* After the warm bath he passed a pint and half of urine. December 1st.—Is evidently better, has slept a good deal, abdomen rather full, and tender, urine clear and pale. Poultice to abdomen. Pt. December 2nd.—Pulse 108, of fair force. Temperature 99°. 4th.—Abdomen moves well in inspiration, as long as the poultice is on he is comfortable, but when it is removed he is in much pain. Pulse 87, weak. Marked tenderness, and some swelling of right great toe, had the same 6 months before. Sleeps well. No dulness in abdomen. The urine acidified with H.Cl. deposits a fair amount of uric acid. On 7th the Opium was ordered 4*tis horis,* on 9th 6*tis horis,* and on 11th *ter die.* The abdomen was quite painless on 9th, and the gout nearly gone. 16th.—Is quite well, his hands also have regained power. He went out on 18th.

The nerve disorder in this patient on both occasions was more hyperæsthesia than neuralgia; in the first it was certainly devoid of all inflammatory complication (though it is remarkable that the temperature was 1° F. higher than on the second), but the same can hardly be said of the subsequent and severer seizure. The appearance of gouty inflammation in the foot makes it not improbable that some degree of the same pathological change affected the peritoneum. However, if such was the case, the inflammatory process can hardly have proceeded further than the stage of hyperæmia, for no evidence of the existence of effusion was discovered, and the disorder was of short duration. Admitting that the second attack was chiefly of gouty origin, it is noteworthy that the urine did not manifest any notable deficiency in uric acid. It is difficult to say whether the first attack was due solely to lead, or to lead and the cause of gout combined; the success of the treatment then employed, which I have generally found very effectual in lead colic indicates that the former was the case. The opium which was freely given in the second attack answered extremely well, it evidently did not interfere with excretion, and favoured the development of the articular crisis. The history seems to me to point out very plainly how important it is to correct treatment to have a knowledge of the causes even more than of the phenomena of disease.

The following history seems to me of some interest as marking a relation between abdominal neuralgia and epileptiform and trance-like seizures.

Case 10.—E. H—, æt. 15, seen October 29th, 1863. Is usually a cheerful, lively, active girl, her mother says "not one of the fussy sort," does not appear to me hysterical in the sense which I attach to the term,[1] but is extremely nervous at present, and very easily startled. She had been ill now about 11 days, suffering at intervals with abdominal pain, loss of appetite, and sickness of stomach. The pain is referred to the lower abdomen, is very distressing, causing her at times to writhe about in great agony. She takes scarcely any food the last 4 days, retches and vomits some mucus. The abdominal pain is not increased on pressure, she turns and twists about, and lies in various positions. No trace of blue line on gums. Bowels costive, urine free. Catamenia regular, but rather too copious. When younger she was subject to epistaxis. Pulse distinct, 111; skin warm. Pupils rather large. Three months ago she was under my care for fits, got better. These seem to have commenced a little before Christmas, 1862. They came on at first continuously for 7 days and nights. She struggled violently, her eyes seemed as if they would roll out of her head, and she was quite unconscious. She got and remained well for 6 weeks. After that the attacks returned irregularly but less severely; they occurred mostly at night; her mother has several times found her lying unconscious on the floor. During some of these attacks, if her mother's account can be trusted, she wrote most wonderful letters, and had intercourse with all the saints in heaven! This may be perhaps taken as some evidence of the existence of ecstatic delirium. She went to Yarmouth about May last and improved much, came back quite fat and well, but relapsed and drooped as soon as she returned. She appeared to wither like a flower, her mother says. About October she had an attack of paralysis, the face was drawn to the left side, the sight of the left eye was lost completely, and there was internal squint. From this she soon recovered. About this time she had several attacks of unconsciousness, her face was pale in these, and her neck swelled to twice its natural size, while all her limbs were much convulsed. I saw her suffering with the abdominal pain in the evening and ordered Opium, ♏xxx of Liq. Opii in an enema, and Pil. Saponis Co. gr. v. *o. horâ.* She took 5 pills, the pain subsided very much, but she did not sleep. The next morning, October 30th, I found her cheerful and able to eat a little; she had taken an egg. During the night she had several attacks of unconsciousness and slight convulsion. I ordered Quinæ Disulph. gr. iij + Acid. S. dil. ♏vi + Tr. Zingib. ♏vi + Aq. ℥i *ter die,* and Pulv. Ferri Carb. Saccht. gr. xv *ter die.* November 3rd.—She has had frequent returns of pain which have been more or less quieted by opiate enemata. I found her to-day in one of her fits. She lay quiet on the bed, apparently unconscious, the angles of her mouth drawn to one side or other, the globes of the eyes turned up, and the pupils of medium size. The left arm and the legs were perfectly rigid, the right arm was extended and mobile. The left arm was flexed, the legs were extended—the right completely, the left partially. The face was not markedly pale. The previous night she had severe pain; it passed off after an opiate enema, but returned again this morning. The treatment consisted of a few full doses of quinine, and Citrate of Iron and Quinine gr. x *t. d.* with some atropine or belladonna, and opium, and cod-liver oil. The fits and the pain were much mitigated, but before long I lost sight of the patient.

---

[1] A patient I call hysterical who magnifies her ailments, courts sympathy unduly, is selfish, absorbed in her own fancies or troubles, is unreliable, or actually deceitful, and has undergone no serious bodily or mental shock or suffering which might occasion nerve disorder. Cases which present none of these features may practically be regarded in the same light as any other confessedly physical neurosis.

The interest of this case consists, I think, in the evident relation which it establishes between abdominal neuralgia and epileptiform attacks. There can be no doubt that both were manifestations of the same state of nervous system, and that the "grundleiden" in both was a lowered state of nerve-force. In another young female, who was for a considerable time under my care, very marked epileptiform attacks remitted on two occasions very considerably during the time that she was suffering from more or less frequent and severe pain at the epigastrium. The first remission, which recurred before I saw her, lasted nearly a year. She was utterly intolerant of tonics, but benefited a good deal with K. Br. It seems to me a step in advance to trace thus relationships, or even homologies, between apparently different maladies.

The following case was by no means clear at first, though its subsequent course removed all doubt.

Case ii.—C. L—, æt. 35, admitted May 19th, 1869. Has been ill 6 months more or less, had catarrh in the winter. Has been unable to lie on his left side 2 months, and has lost much flesh. Had rheumatic fever and ague at Naples 7 years ago, but never had dysentery, He complains of sudden severe pain passing through from the left iliac region to the left loin, which comes on suddenly and seizes him sometimes even when he is lying still. The left iliac region is tender, and the abdominal muscles in this situation are tense. The abdomen is not distended. Has been afraid to eat for some time because it fills him with wind and brings on pain; he is always relieved after dispersing flatus. Stepping down suddenly to a lower level causes him pain like an electric shock extending up the limb as high as the lumbar spine. Hip-joint quite free and mobile. Has dry retching in morning. Has to rise several times to micturate at night. Urine is natural. Some tenderness in left gluteal region near crest of ileum. Pulse 93. Skin cool. With Citrate of Iron and Quinine gr. x *ter die*, and often-repeated subcutaneous injection he improved greatly, was able to take more food than he had done for a long time, was more free from pain than he had been for 4 or 5 months, and gained strength. He went out June 12th, or thereabouts, but when I saw him some time after he had a story to tell me of leeching and aperients for (presumed) congestion of the liver, and had lost ground materially. The muscular tension and tenderness on pressure made me apprehensive that there might be some pelvic osteitis, or other deep-seated inflammatory mischief, but the steady improvement under the use of tonics and sedatives made it quite clear that nothing of this kind existed, and that all we had to deal with was abdominal neuralgia, probably of malarious origin, whose hold of the system was riveted by flatulent dyspepsia and debility.

In this case as in several others I have seen there was evident implication of the viscera in the disorder, as well as of the abdominal parietes.

The neuroses which occupy the upper abdominal region, and commonly involve the stomach, may be reasonably supposed to affect, at least in many instances, the solar plexus. Romberg describes a cœliac neuralgia or hyperæsthesia of the solar plexus, the pathognomonic feature of which is a peculiar sense of fainting and annihilation accompanying the pain. The treatment of this, he says, does not differ in any essential point from that of gastrodynia. I find great difficulty in making any arrangement of the very various and interesting cases of nerve disorder which affect this region. Some rough discrimination may be made of instances in which some hyper- or dysæsthesia predominates, of those in which motor disorder (vomiting) is the prominent feature, and of those in which the rejection of various morbid products is a chief phenomenon. In some cases it appears that the terminal ramifications are more affected, in others the disorder appears to be more central.

Case 12.—R. T—, female, æt. 9, admitted February 15th. Ill five weeks, pale. Complains that she has pain after eating, and at other times. It is severe at night. No marked epigastric tenderness. No appetite. All her food lies heavy at her chest, but she never vomits. Has constant thirst. Pulse feeble. Tongue clean. Skin cool. With citrate of iron and quinine and ol. morrh. she recovered speedily.

Case 13.—M. A. T—, female, æt. 60, admitted October 29th. Short and stout, of rather sanguine aspect. Ill two or three years. Suffers with pain commencing under right ribs which passes to middle of abdomen and epigastrium, and backwards to the interscapular space; "a dreadful burning pain it is," and attended with much flatulence and nausea. It lasts five or six hours and goes off, leaving much soreness and depression, "so that she does not know what to do." Food does not affect it at all. The pain used to come on for six weeks every day while she was at Swindon; after coming up to London she was free for fourteen days. She has been dosed with emetics, which made her bring up much blood (Oss. at once) mingled with phlegm, and has taken opiates which made her sick. Tongue white. Urine generally pale and copious. Appetite good, except when pain is on her. Bowels regular. Pulse good. No fever. Never had ague. With quinine, iron, pot. iod., ammon. carb. and bark she improved very much, so that on December 5th she reported that she was getting quite well except some pain about the head. It seemed, she said, like new life to be relieved from the stomach pain. This patient had had rheumatism severely two years before, and her gastralgia probably contained a rheumatic element.

Case 14.—J. S—, æt. 2, male, admitted August 27th. Since he had measles seven or eight months ago has suffered much with pain at lower sternal region, "is always beating it day and night." Has had pertussis recently. Lips swelled, cracked, and ulcerating. With citrate of iron and quinine and ol. morrh. he benefited greatly.

Remarks.—In the three preceding cases it is clear that the pain was not a mere gastric disorder, as it was independent of taking food; it was essentially a similar affection to the mesenteric neuralgiæ which we have just noticed. In the first case there was constant thirst, a very misleading symptom, and which one may certainly affirm would not have been quieted by salines. It is a less common dysæsthesia than pain, but was present (periodic) in the case recorded by Brodie.[1] In the second case the burning pain and the sanguineous vomiting might have raised suspicions of ulcer. Gastralgia is rare in such young subjects as that of the third case.

---

[1] 'Local Nervous Affections,' p. 30.

Dr. Leared has recently drawn attention to the good effects produced by arsenic in cases of gastralgia. The points which he specifies as indicating the suitableness of this remedy are—the pain being violent, its coming on when the stomach is empty, and not being induced by taking food, the epigastrium being free from tenderness, the pulse not accelerated, the papillæ of the tongue at its tip not being red or prominent, the absence of aneurism of the abdominal aorta, or one of its branches, of gall stones, gastric ulcer, cancer, and congestion from disease of the heart. One of his cases is as follows. A gentleman, æt. 54, strongly built, but thin and worn-looking, of temperate habits, had endured great trouble and anxiety. About 2 years before Dr. Leared saw him he was, for the first time, seized with a most violent cramp-like pain in the stomach, which often recurred subsequently. At first the intervals between the attacks were a month, but latterly he had not been free for a single day. They generally came on at night after going to bed; and it is worth noting that he dined early. The pain lasted 2 to 4 hours, and was described as almost insupportable. It was attended by vomiting of acid fluid, which, however, did not relieve his suffering. But with the exception of slight flatulency he had none of the ordinary symptoms of indigestion. The appetite was good, and the bowels acted well. He had right inguinal hernia, which had been regarded as the cause of the pain. Liq. Arsenicalis, given in doses at first of ♏ij *ter die* after food, and gradually raised to ♏viij, completely cured him in 5 or 6 weeks. (v. 'Brit. Med. Journ.,' 1867, November 23rd and 30th.) In a case of gastralgia under my care, which proved very refractory to treatment, I found Arsenic gr. $\frac{1}{24}$, with Opii et Extr. Bellad. aa gr. $\frac{1}{3}$, more efficacious than anything else. Dr. Norris also has found, by personal experience, Dr. Leared's remedy effectual for "neuralgia in the bowels."

The difference between gastric hyperæsthesia and gastric neuralgia (gastrodynia) is well seen by comparing such a case as the above, or that recorded by Graves, p. 757, with those I have related at pp. 421—423. The pain in the former is markedly intermittent, is more severe, and much less influenced by ingesta than in the latter.

Case 15.—S. H—, female, æt. 39, admitted January 7th. Ill fourteen days. Suffers with pain in the stomach, chest, and back, which is as bad in the intervals of her meals as directly after. No pain on pressure. One article of food has the same effect as another. Is quite free from pain when lying down. Drinking warm water gives great relief to pain. Has been worked hard. Appetite tolerably good. Tongue clean. Bowels costive. With ferri sulph. gr. iij + pulv. cinnamomi co. gr. v + aloes gr. i in pil. ij *ter die* she quite recovered in about seven weeks. Citrate of iron and quinine was tried for a short time, but was less efficient than the first combination.

Case 16.—A. F—, æt. 43, female, admitted June 30th. Ill two years with pain in abdomen, at lower chest, and between shoulders; much worse after eating; one kind of food causes as much pain as another. Wine or beer disagrees, and even gruel brings on the pain. Never vomits, but has nausea, and watery fluid rises up into her mouth. No appetite. Not thirsty. Urine very high coloured, clear, scanty. Argenti nitras with extr. hyoscy., bismuth with tr. opii were of little avail, and strychnia was injurious, but ferri carb. ʒj *ter die*, with lactic acid at meal, continued for about eight weeks, effected a cure.

Remarks.—The last two cases form a kind of transition to those where the disorder has more the character of hyperæsthesia than pain. The combination used in the first is nearly the same as that employed by Abercrombie (v. 'Dis. of Stomach, p. 51) with success in a very intractable case of gastralgia. The lactic acid was very beneficial in the second case, I have used it now for several years, and am quite satisfied of its value as a peptic when the functional power of the stomach is low, and its nerves are weak and irritable. In certain cases it is, I think, decidedly preferable to muriatic acid. That which I have used has been prepared for me by Mr. Blades, 85, Edgware Road, a most careful pharmaceutist.

The following history is worth recording from the distinct connection which it exhibits between a respiratory and an abdominal neurosis.

Case 17.—Mrs. ——, æt. 43, seen April 9th. Has been suffering for some weeks with bronchial catarrh, and latterly, also, with pain of a wearying, aching kind at the epigastrium, and along the margin of the ribs. She has been getting weakly and nervous for some months. I prescribed citrate of iron and quinine + chloric ether + tr. nucis vomic., and the pain soon disappeared, but one night a violent attack of asthma came on, so severe that she seemed to be in danger of actual suffocation, and at the same time bronchitis was set up, she had cough, expectoration, and wheezing, with dry large tube râles in both lungs. Under the use of ipecacuan, morphia, &c., this subsided, but she became extremely weak, and had again pain in the former situation, and also in both loins. She again took iron and quinine, and the pain diminished much; but on account of some nocturnal febricitation I changed this for quinine gr. ij *ter die*. In a day or two after she had a most severe attack of the pain in the abdomen, attended with retching. It occurred at night, entirely prevented sleep, and was relieved at last by a glass of brandy about 4 a.m. The next day she was free from severe pain, but exceedingly sore and tender all about the epigastrium, right hypochondrium, and loins. There was decided tenderness, and the discomfort and dysæsthesia were much aggravated by turning to the left side. The urine was clear, acid, not red. The next night she slept well with a "nightcap" of hot brandy-and-water. She subsequently took carbonate of iron and tr. cinchonæ, and I ceased to attend her. The bronchitis had been attended with more or less of asthma every morning, for which she had been smoking stramonium with benefit, but after the severe attack of gastralgia the cough and chest affection almost disappeared.

Case 18.—J. N—, æt. 36, male, admitted April 9th. Has been ill since last August except for about six weeks altogether, and those not occurring continuously. Is a painter, but has no blue line on gums; had colic six years ago. Always was a nervous man. Eyes prominent; expression of countenance hypochondriacal. Lips red. Tongue coated, dryish. Skin cool. Pulse feeble, quiet. Appetite very bad; is thirsty. Bowels costive. Urine thick, pretty free. Has continual nausea. Suffers from violent pain at epigastrium passing right through to shoulder, attended with sickness, which comes on after eating and at other times. The epigastrium is tender, most so towards the left side. Vomited matters are greenish, mucousy, strongly acid. Food causes pain as soon as swallowed. Pain relieved by lying on the back. On 15th the urine had an iridescent pellicle on the surface, was neutral, effervesced strongly with acid, and deposited a large amount of white phosphates. This tendency of the urine to deposit phosphates continued up to May 12th, soon after which time he was made an extern patient, and came under my care. He had previously been treated with lime water, bismuth, prussic acid, hyposulphite of soda, repeated blisters, leeches, and pepsine. May 17th.—His symptoms were less severe, he had had no sickness for six days, but felt much oppression at the stomach. Argenti nitratis gr. $\frac{3}{4}$ + extr. hyoscy. gr. iv in pil. *ter die* was ordered. At the end of ten days he was a great deal better, could take food "quite nicely;" felt his chest more free, and was getting more strength. He then went to the country. Urine was then pale and clear.

Case 19.—J. W—, female, æt. 22, seen September 6th. Ill seven to eight years. Suffers with pain and tenderness in left side, passing round and extending to both scapulæ, worse after food and exertion. She is often sick, and vomits in a few minutes after food. The vomited matters are very acid. Only streaks of blood ever brought up. Light food agrees best, but milk is rejected. Arrowroot or sago suit. Is easier in morning, when stomach is empty. Tongue too clean, over red. Catamenia regular. Bowels open. Pulse weak. No fever. Not much flatus. Much emaciated lately. Urine very pale, sp. gr. 1010, not albuminous. She had been treated six years before for gastric ulcer. She took argenti nitrat. gr. $\frac{1}{2}$ and opii gr. $\frac{1}{3}$ in pil. *ter die* for three and a half months; in fourteen days she was able to take meat; she gained two stone in weight and quite recovered. Not a trace of cutaneous discoloration was produced.

Case 20.—Mr. T—, æt. 25, seen in consultation with Mr. Cooper. Has been ill about four years, since a bilious fever in America; in three months after this his stomach symptoms set in, and have continued wherever he has been. He suffers uneasiness at the epigastrium immediately after taking food, and is not relieved until he has got rid of it, which appears to be effected partly by vomiting, partly by digestion. The matter vomited is very acid (tested) and tastes hot and bitter. He vomits about Oj in the day, by small quantities at a time. It does not appear that he finds much difference between meat and lighter food, he suffers even more after beef tea than pie crust. No tumour to be detected in the epigastrium, the whole abdomen is collapsed and soft, the bowels appear empty. Liver descends low in epigastrium, probably from the loss of any support from below. No notable tenderness at epigastrium, but some soreness. At times has much flatus with his sickness. Tongue smooth, rather too red. He is very emaciated, his eyes of a clear white, and his aspect much like that of a phthisical person. His lungs and heart appear sound. Urine full-coloured, feebly acid. He is very thirsty, but dares not drink for fear of causing irritation of the stomach. Has taken bismuth, pepsine, hydrocyanic acid, and strychnine, but with very little good effect. It was agreed that he should take iced milk in dessert spoonfuls every twenty minutes, and nothing else for some days, except argenti nitrat. gr. $\frac{1}{2}$ + opii gr. $\frac{1}{3}$ in pil. *ter die.* In six weeks he came to see me at my house, and reported that he was much better, had gained flesh and strength, had no sickness, and was able to take meat and other solids pretty freely. The nitrate of silver had been omitted the last week; he had had some nausea the last two days. I have not heard of him since.

Remarks.—The last three cases are good examples of gastric hyperæsthesia, though I do not assert that this was the sole disease. The question will occur to most readers whether the symptoms were not due to ulcer of the stomach. I think it is quite possible that ulcers may have existed, but I doubt very much whether they were the cause of the symptoms. In the first case the irritability of the mucous membrane was such that it led to an excessive pouring out of acid, in consequence of which the urine was left in a minus condition, and deposited phosphates. I have seen this kind of draining off of acid in a few other instances. In the two other cases the amount of acid secretion was not so great, but the functional power of the organ was extremely impaired, and there was great hyperæsthesia (local). To diagnose the condition of simple gastric hyperæsthesia from that which is associated with ulcer is, except where perforation of a blood-vessel has occurred, a matter of exceeding uncertainty. It is notorious that ulcers may go on to perforation of the whole wall of the stomach without having given rise to any symptoms at all, and it is quite common to meet with instances where the symptoms preceding an attack of hæmatemesis have been only those of very moderate dyspepsia. Quite recently I have had a good proof how distinct the ulcer and the dyspeptic symptoms may be in relation to treatment. A cook, æt. 42, had been under my care several times with disordered digestion, but of quite an ordinary character. She had always been pretty speedily relieved by appropriate treatment, and was so on this occasion. She had been free from pain at the stomach for some time, was discharged on a Thursday feeling quite well, and continued so until the following Sunday, when towards night a copious gush of blood, about Oiij, took place from the stomach, declaring too plainly that her previous malady had not consisted solely of the symptoms of which she was conscious. After long attention to this subject I incline more and more to the opinion that, except in some particular instances, ulceration *per se* produces no distinctive signs until perforation ensues, and that the pain and functional disorder with which it is often attended are no necessary results of the lesion.[1] Their existence depends much more on the state of the general mucous surface than on the presence of ulceration. Of the value of nitrate of silver in conditions of gastric hyperæsthesia I have myself not the least doubt, though I feel how difficult it is to account for its action. I do not rely at all on the above cases to prove its virtue, because it was given (except in the first) along with opium. This is usually a useful adjunct, but I have certainly seen the nitrate beneficial when given alone, and I am satisfied that its action is more and other than that of the sedative. Its influence on nervous tissue is attested by the good effects it produces in "ataxie locomotr. progressive." The difference between gastrodynia and gastric hyperæsthesia is well illustrated by these cases.

In the 'Clinique Med.' Andral has related several highly interesting cases of gastric derangement. The following he justly considers a neurosis. A young lady had been frequently during her life affected rather seriously with respect to her stomach. When we saw her in the winter of 1833 she could not digest any food without feeling acute pains in the epigastrium. She soon gave up all sort of nourishment; she was unable to bear the slightest food; vomiting set in, and the patient became so debilitated and emaciated that she was considered as dying. The tongue retained its natural appearance. Amidst this increasing debility the patient was distressed by a very acute feeling of hunger, but in vain did we strive to satisfy it. The lightest food given to her was thrown up by vomiting; or if it was retained its digestion occasioned the patient indescribable suffering. M. Recamier advised cold affusions, which were performed with water at about 82° for about 5 minutes over the whole body. She bore the first very well; but when replaced in the bed she felt herself so very ill that she refused to take any species of food. On the following day the affusion was repeated, and this time the patient was actually forced to take a tolerably large slice of bread in some beef soup immediately after. The affusions were continued, and after each of them the patient was made to take a meal of a still more substantial quality; she very soon became able to digest a mutton chop, and quite recovered ('Spillan's Trans.,' p. 877). This was undoubtedly a case of gastric hyperæsthesia, to the overcoming of which the tepid affusions, no doubt, materially contributed, but the enforced taking of food was probably almost as important by gradually accustoming the morbidly sensitive surface to the contact of alimentary ingesta. In cases of this kind we may have recourse to food prepared according to Dr. Marcet's method, or to *raw* beef or mutton scraped and passed through a fine sieve and mixed with broth, tapioca, sago, or jam, into a thick purèe. Trousseau has proved the remarkable efficacy of this in extreme instances of infantile diarrhœa, and it is quite conceivable that it might be as useful in states where the stomach was more at fault than the bowels. The raw meat should be given at first in small quantities, about 1 ounce in divided doses during the day. A few grains of Pepsine might be given advantageously with the meat. In difficult cases certain devices may render us important service. Thus, Andral tells us that he has seen persons who did not digest well except they took their meals in *bed*, and remained there all the time the process of chymification was going on. A lady under his care could not re-establish the functions of her stomach which had been for a long time the seat of irritation, except by eating in a bath. At first she breakfasted and dined in this way; she then took but one meal so; and after strictly adhering to this practice for about 6 weeks she was completely cured. Sometimes it may be well to follow the example of a young lady suffering under acute tuberculosis who was under my care. Her stomach was very irritable, but at one time she used to take two dinners, the first was speedily rejected, the second she was able to retain. The hyperæsthesia was exhausted by the first meal and the vomiting, and the organ became then more tolerant for a while. The same principle applies to medicine.

---

[1] Dr. Wilks informs me that Dr. Habershon concludes from his dissections that the presence or absence of pain depends on whether the ulcer does or does not involve nervous filaments. I doubt whether this expresses the whole truth.

In some instances an electrical stimulus may be used with good effect to animate a weakly stomach. A practitioner once informed me that he had used Pulvermacher's chain successfully in his own person for this purpose.

Popper ('Schmidt,' Vol. 130, p. 97) relates the case of a young girl, neither chlorotic, nor hysterical, whose stomach was distended with gas, and painful, who suffered from eructations and vomiting, diffused a strong smell of Acetone, and complained of constrictive pains in the stomach, especially after eating. Bowels irregular, confined, or relaxed. Very various medicines were administered 4 months without good effect. She was then faradized 5 minutes long, just before taking food, both electrodes being placed on the epigastrium, the current being gradually increased in strength. The vomiting ceased after the first application, and after the 12th there was no vomiting, or nausea, or eructation, and pain after eating had quite disappeared. The patient became hungry, which had not been the case for months, and took as much as she had previously without inconvenience. Her bowels became regular.

Another similar case is related by Popper. He also says that electricity may be successfully used in the obstinate vomiting of pregnancy, though there is some risk of causing abortion.

Case 21.—G. C—, male, æt. 49, admitted April 15th, getting gradually ill two months. States that whatever he eats or drinks all returns again, either in a few minutes, or in one or two hours. Food does not cause pain immediately. Epigastrium not notably tender. The vomiting begins with a pain about the umbilicus, which "works upward," and produces the sickness. No sign of any tumour. Of placid, quiet demeanour. Rather pale. Tongue natural. Bowels regular. Urine copious, has not full control over it. With strychnia and liq. opii sed. *ter die*, he was quite well in a month.

Remarks.—In this case (and such are not infrequent) motor disorder was a much more prominent symptom than pain. The affection might almost be called a chorea of the stomach. The chief action of strychnine is on the nervous motor apparatus, and thus it proves a suitable remedy in conditions like the above by its toning and steadying influence.

Case 22.—A lady, æt. about 48, a neuralgic sufferer for many years, and who had also had trouble from a small uterine tumour, was operated on for the latter, and suffered subsequently with rheumatoid pain in her left shoulder. She was injected subcutaneously in the painful part, and the result was that the pain fled from it to the stomach, and ever since has attacked her there from time to time. On a second occasion the pain seems to have been displaced from the back by the application of a liniment, and again to have attacked the stomach. During the winter of 1867 and the succeeding spring she suffered extremely with irritability of the stomach. On one occasion she was literally kept alive for 17 days by nutrient enemata. Her stomach would not bear food, a teaspoonful of frozen chicken broth being frequently rejected. I saw her in 1869, when she was suffering with one of these attacks of gastric irritability, having much pain at the pit of the stomach with tenderness and dry retching. The bowels had been sufficiently opened, and a subcutaneous injection of Liq. Opii Sedat. ♏x at the epigastrium was resorted to. It acted most satisfactorily, the sickness directly ceased, and the pain was much relieved. She was soon able to take food, and returned to her ordinary condition, suffering much with shifting neuralgia in various parts, but free from gastric disorder during 3 or 4 weeks that she remained under my observation. The cause of the attacks of vomiting was I believe partly a torpid state of the liver, the evacuations being at one time very unnatural, quite coffee ground, and improving materially under small doses of Hydr. c̄ Cretâ.

The following instance is very similar.

Case 23.—Mrs. W. B—, æt. 50—60, of stout frame and strong mind, had suffered for several weeks with severe rheumatoid neuralgic pain affecting one side or other of the chest, and attended at first with considerable bloody expectoration. The latter had quite subsided for some weeks, when I was consulted again, but the pain had seated itself obstinately in the region of the stomach, and was attended with much nausea and retching. Quinine and Citrate of Iron and Quinine only seemed to increase the stomach derangement. There was no fever and the urine was clear. I injected Liq. Opii Sedat. into the subcutaneous tissue of the epigastrium, whereupon the pain and retching ceased, but the pain removed to the region of the cæcum. I injected her there with some but not at all complete relief. Aconite lotion was of some service, and the pain at last quite disappeared under the use of Potass. Iod. She then took Sesquioxide of iron, which once before had benefited her much and soon got quite well.

Mr. Harrison has also recorded instances in which the same means was of great service (v. 'B. M. J.,' 1868, Aug. 23; 1869, Dec. 4).

The above cases and some others which I have had lead me to regard subcutaneous opiate injection performed *loco dolenti* as an excellent remedy in some forms of gastric disorder. As the same procedure applied at a distance not unfrequently causes vomiting, I am much disposed to think that the site selected is not a matter of indifference. A sufferer from sciatica tells me that he has found morphia injection much more efficacious at the hip than at the shoulder.

The *vomiting of pregnancy* is more a motor disorder than a sensory; it certainly is not to be compared with gastralgia as regards the amount of pain, and has its origin as a reflex phenomenon more in irritation of the uterine than of the gastric sensory nerves. A rational treatment it seems to me must aim either at removing or quelling the primary peripheral irritation, or at rendering the centre insusceptible of it. It is, however, possible to accomplish the latter by making a powerful sedative impression on other sensory nerves, which are correlated with the motor nerves of the stomach, just as we have seen that a neuralgia may be lulled by a sedative application to the periphery of other unaffected sensory nerves. Dr. Hannotte Vernon's plan (v. 'B. M. J.,' 1857, Oct. 31) seems to me well adapted to effect this, though I should hesitate to employ it in case of great exhaustion and weakness of the heart's action. Dr. Vernon says "a radical error is generally committed in the administration of opiates in the gastric irritability of pregnancy, and in other cases where it is desired to allay vomiting. The bulk of the dose is almost invariably too great, the sedative is given too much diluted, and the quantity of fluid is resented by the stomach." . . . The bulk of the dose (which is essentially a lotion to the coats of the stomach) should never exceed one fluid drachm, and it may be made less with advantage. Half a grain of acetate of morphia, 3 drops of dilute Hydrocyanic acid, and one of Fleming's tincture of aconite to ʒj or even ʒss of water, will not only burthen the stomach less, but will produce a greater topical effect on the nerves of the stomach than if given in the usual state of dilution. As to the administration of food I concur in Dr. Vernon's recommendation—that if any attempt at a meal be made, it should be soon after a dose of the medicine, and should soon be followed by another; or the diet should consist of single spoonfuls of milk, strong beef tea, or egg brandy, often repeated, or very frequent doses of protein. He states that the most remarkable case of vomiting he ever heard of was successfully treated by gr. v doses of protein given in ʒj of milk every hour. Administration of food by the rectum is however generally the best procedure in states of extreme gastric irritability which do not yield to the measures above mentioned. Mr. Garraway has recently obtained very good results from the administration of Carbolic acid in the vomiting of pregnancy, and other forms of sympathetic vomiting. He gives ♏j doses of the crystal liquefied by heat, and diffused in ℥ss of thin mucilage *ter die* (v. 'B. M. J.,' 1869, March 13). I fear, however, that in the severer cases this remedy would hardly avail more than others. Dr. Routh found Chapman's ice-bag applied to the spine for an hour twice a day successful in a case where all other remedies failed. By way of prevention it is desirable to induce the patient (if we are consulted early) not to yield to squeamishness, or actual nausea. However uneasy the stomach may be and reluctant to receive food, it will be found that if the attempt is made and a few mouthfuls got down, the organ becomes more tranquil, and tolerates and digests a pretty good meal. On the other hand, by yielding to the dysæsthesia its power is confirmed, and debility from starvation adds to the nerve-disorder.

In connection with the above topic, I may here advert to some important remarks of Dr. Henry Bennet (v. 'Lancet,' 1868, Vol. ii, p. 296). Alluding to a case of so-called hysterical vomiting excellently described a few weeks previously in the same journal in a clinical lecture by Dr. Hyde Salter, he affirms that such vomiting in the immense majority of cases is very conclusive as to the existence of acute or chronic inflammation of the uterus or ovaries. He does not doubt that uncontrollable vomiting with or without hysteria may be the result of mere morbid states of the nervous system, but he asserts that in a very large proportion of the more intractable cases in young females uterine or ovarian lesions are at the root of the mischief. When these lesions are brought to light, treated and cured, the intractability of the case ceases and the patient gets well. It may, however, be no easy matter to discover these lesions. In one patient, who but 14 days before had been pronounced after examination by a competent authority free from disease of the organs in question, Dr. Bennet at first could not get a view of the cervix, but a week later, after due preparation, a satisfactory inspection was made, and it was found that the uterus was enlarged and retroverted on the rectum, that an abundant sanious discharge issued from the os, and that there was excoriation of both lips of the cervix extending into the cervical canal. The warning which Dr. Bennet gives is very important, and there can be no doubt of the necessity for a most searching examination in cases of this kind. I can scarcely doubt, however, that Dr. Salter's diagnosis was correct, viz., that the vomiting was solely the result of a morbid impressibility and mobility of the nervous system—inasmuch as the patient was not emaciated and had no appearance of serious illness. Her case was certainly remarkable. She was aged 19, and had suffered all her life long from anomalous irregular pains in various parts of her body and vomiting. These symptoms became much more intense when she began to menstruate 5 years ago. Since this epoch her principal symptoms have been frontal headache, pains at the lower part of back and abdomen, and in the genitals, where they amounted at times to agony, frequent passing of very aqueous abundant urine by day and night, piles at the monthly period, globus hystericus, hunger, an unsatisfied craving appetite, thirst, and rejection of more or less of every meal. During about 18 months she had partial paralysis of the left arm, which used to go off as the day advanced. The occurrence of piles at the catamenial periods, and of especial pains at the lower abdomen, back and genitals are suspicious features, however, and if they were present in a case under our care ought to make us institute a very searching scrutiny.

The following cases, like those just noticed, show the need for seeking out causes of remote irritation. Lederer has seen 3 cases in which the adaptation of an artificial tooth produced violent effects on the vagi. In one instance, the patient being a healthy young woman, æt. 22, the operation was followed by malaise, vomiting of all food, and most severe and continuous convulsions. Various remedies were vainly tried; at last the artificial tooth was removed, shortened, and replaced; all the symptoms at once completely disappeared. In another instance the operation was followed by shivering, severe pain at the pit of the stomach, vomiting, and finally diarrhœa, followed by exhaustion and sleep. In none of the 3 cases were there any local symptoms ('Syd. Soc. Y. B.,' 1865-66, p. 120). The irritation in these cases was evidently set up in the dental nerves, by them conveyed to the medulla oblongata, and from thence reflected on the vagi, sympathetic, and other nerves.

The following are instances where the vomited matters were peculiar.

Case 24.—E. S—, æt. 36, female, of rather sanguine habit, admitted

May 11th. Affected with pityriasis all her life. At the catamenial periods, which occur regularly, and the intervening fortnights she has copious vomiting of stuff like brown water which lasts for twelve hours, and is preceded by violent headache. In the intervals she is tolerably well. Digestion pretty good. Very apt to take cold. No râles in lungs posteriorly. Is worse after any exertion. Functions in good order. Lives at Chiswick near the river in an open meadow. A week later the urine was found exceedingly pale, aqueous, and non-albuminous. Bi-weekly doses of calomel with nitro-muriatic acid and taraxacum were given for five weeks without avail. She described herself as suffering with a sense of dreadful weight round the chest for several days before the vomiting came on. On June 7th she brought up much thick stuff like brown phlegm. Bowels relaxed as they always are in warm weather. Strychnia, quinine, opium, arsenic were now given ; at a later period iron was substituted for the latter. She improved steadily under this treatment, and was discharged apparently quite well August 27th.

Remarks.—I read this case as one of periodic congestion of the stomach issuing in exudation of bloody fluid, which became darkened by the gastric acid. The result of the treatment proved that the pathological condition was one of nerve disorder, and not of hepatic congestion and obstruction. The cause of the nerve disorder is obscure, but the locality of her residence affords some ground for suspecting the operation of malaria. The concurrence of severe head-pain and paralysis of the vaso-motor nerves of the stomach deserves to be noted.

Case 25.—E. T—, æt. 35, female, married, five children. Of rather sanguine aspect. Admitted February 9th. Ill one month. Has some cough and spits much blood (a teacupful in one day), and some phlegm. The blood comes up with nausea, but no vomiting, and is of a very bright colour. This hæmorrhage has been going on the whole month that she has been ill. The first of her illness was that she felt extreme debility, and fainted several times a day. About eight days later blood came up. She has copious cold sweats at night, and feels very shivery in the morning. Pulse soft. Bowels costive. Catamenia were delayed a week when the blood first was brought up. Chest deformed, right front flattened, there is right lateral curvature. No dulness anywhere, but weak breathing all throughout both lungs. Some epigastric tenderness. She always experiences extreme exhaustion a quarter of an hour after taking food, it lies heavy, but does not cause much pain. She continued under observation till April 20th, having lived part of the time in Paddington instead of Walworth, where her home was. The former locality agreed much better with her than the latter. The treatment consisted of quinine, opium, iron, and strychnia variously combined, and had a markedly beneficial effect. Gastric hæmorrhage recurred several times, but she had none for the last three weeks of her attendance. Extreme weakness was a prominent symptom, attended frequently with what she termed faintings. These I believe, from what

I witnessed of them, were rather leipothymic than syncopal. There was apparent unconsciousness, but not the same loss of muscular power which occurs in syncope, nor the same pallor of face. The presence of gastric ulcer must be considered a probable cause of the hæmorrhage. My own opinion, however, is that ulceration did not exist, or, if it did, that it was not the cause of the symptoms. The bleeding I look upon as analogous to epistaxis, and as proceeding from active congestion of the capillaries of the mucous surface. For (1) it is proved by Dr. Brittan's case (v. 'Brit. Med. Jour.,' April 2nd, 1859) that copious bleeding may take place from the stomach without any ulcer, and without obstruction to the venous current; (2) the peculiar and extreme debility was not consecutive to, and produced by, the loss of blood, but may be considered rather as its cause. By affecting the vaso-motor nerves of the stomach it produced the active congestion. The cause of the debility itself was probably some malarious miasm generated at Walworth, no unlikely place for such an occurrence. (3) The treatment was not such as was likely to benefit ulcer, at least while it was extending.

I will refer here to a similar case which I have recorded at length in the 'Assoc. Jour.,' 1856, June 7th and 14th, in which a weakly female, whose heart and lungs appeared sound, had various symptoms of aguish disorder, with frequently recurring hæmatemesis and extreme debility. With quinine, iron, country air, and rest she improved much, and recovered at last after a voyage to Ireland. I saw her recently (June, 1863) in good case. May, 1869.—Is now in last stage of phthisis. A severe relapse was induced on one occasion by her resuming work while too weak for the exertion. The hæmatemesis in this case was more a kind of frequent oozing of blood than an actual gush. Once or twice, however, pretty free bleeding occurred. I quote from my remarks the following. Rejecting the hypothesis of organic disease as wholly inadequate to account for the symptoms, I observe that the view of aguish disorder being the "grundleiden" is the only one which can explain the phenomena, and it does so fully. The system was under the influence of a depressing poison operating primarily on the nervous organs. This caused the neuralgia, the toothache, the cerebral disorder resembling intoxication, the bewildered feelings, the forgetfulness and loss of sight by its action on the cerebro-spinal system; while its action on the sympathetic and vaso-motor nerves was attested by the hæmatemesis, the syncopic attacks, the aguish paroxysms, and the epigastric sinking. The periodicity of the hæmatemesis and its being checked by quinine testify to its peculiar character. The immediate relapse on recommencing work is exactly what is observed in neuralgia and other nerve disorders; the symptoms, which remain in abeyance during rest when the nerve power is not expended, are speedily reproduced when exertion consumes the yet too scanty stock of strength. In inveterate cases such as this the influence of a pure and bracing air is absolutely essential to cure. Drugs seem to fail partly from actual deficiency of the vital (radical) forces of the system. Another case came under my observation in which hæmatemesis in small quantities went on for about six months, recurring at short but irregular intervals, and continuing for several days at a time. It was associated with severe pain of one knee and great nervous depression. After the ineffectual application of several blisters and much medication, amputation of the limb was advised by an hospital surgeon, but the patient declined. No astringents had any effect in arresting the hæmorrhage, which at last ceased under the use of carbonate of iron, and the pain in the knee at the same time became easier, so that she was able to move about with a crutch after having been for months confined to bed. The knee was never swelled, nor did it present to my eye much appearance of organic disease.

Case 26.—J. W—, male, æt. 38, admitted July 2nd, 1857. Ill since last Christmas, worse last three months. Suffers with pain after food, most after vegetables. Formerly the pain lasted about four hours until vomiting set in, and then was relieved. Now for the last fourteen days he has had vomiting daily in the morning from 3 to 4 a.m., and about 9 p.m. The vomited matters are greyish and frothy, and have contained sarcinæ. Is sometimes quite free from pain when his stomach is empty. No tumour or anything morbid to be discovered in abdomen; no epigastric tenderness. Heart and lungs tolerably sound. Urine thick, and passed with straining and pain felt about the crest of the ilium. Is losing flesh and getting weak. Bowels open; when they were confined some time ago he was better, and had less sickness. Has had hyposulphite of soda without benefit, besides various other remedies. I examined the vomited matter at this date and again September 24th, and on both occasions found sarcinæ in abundance. He remained under my care till October 1st, the symptoms recurring at intervals. Generally towards night flatulence would come on to a considerable extent, and be followed sooner or later by vomiting. Occasionally the flatus passed away *per rectnm,* and once was attended with sudden purging. The gastro-intestinal disorder was evidently no ordinary indigestion; it seemed to be to a great extent independent of taking food. None would occur for several days, and then an outburst would take place. It was in this respect somewhat like the group of symptoms produced by obstruction of the pylorus, but the sequel negatives the idea that there was any such organic lesion. When he came under my hands he had already been treated most judiciously by Dr. Vernon who sent him to me, and I saw only one way of proceeding left open to me, which was to deal with the malady as rather the result of failure of power than as a substantive disease. It seemed possible that if the innervation of the general system and of the stomach in particular could be improved the production of sarcinæ and the vomiting might be materially checked, if not arrested. Whatever part the sarcinæ play in modifying or aggravating the disease with which their occurrence is associated, they are, in all probability, rather accidental than essential. They are found in a variety of conditions, in ulcer, in pyloric obstruction, and simple disorder of secretion, and, in fact, are probably developed like other fungi where the higher organic life is waxing faint and feeble. On this view, then, I treated his malady as a paralytic neurosis with quinine, iron, opium, and strychnia, the quinine being increased up to gr. x *ter die,* and the strychnia to gr. $\frac{1}{20}$. The result was satisfactory, the attacks of flatulent disorder, of pain, and of vomiting became much less frequent, and he gained flesh and strength. He was still, however, subject to recurrences when he ceased attendance (*ut mos est* of hospital externs). I hunted him up, however, in April, 1859, and learned from his wife that he was quite well, and had been so for a long time; "had been nicely" all the last year (1858). After he ceased attending at the hospital he had no further medical treatment.

I have pretty well anticipated any remarks I might have to make. The moral of the case is that it may be well worth while to treat a general condition rather than a particular prominent symptom. It may also be added that there seems some ground, from this as from other cases, to think that the good influence of a course of treatment may show itself long after its discontinuance, perhaps even more markedly than at the time of its being in force. Persons who have gone on a tour, or visit to some distant place, not unfrequently continue to improve in health after their return home.

Flatulence, when it becomes excessive, is, I think, not unfrequently chiefly dependent on nerve disorder. This may not be the sole factor of morbid action, but it is one which needs to be kept carefully in view. Another which is often conjoined with it is venous congestion, which is frequently produced by obstruction of the flow of blood in the portal vein. The following cases are illustrative.

Case 27.—S. W—, æt. 58, female, seen August 13th. Her father and grandfather were gouty. From her earliest childhood she has suffered with severe sick headaches lasting 24 hours, occurring latterly at intervals of 10 days, always worse at the catamenial periods; they never went off without violent sickness. She has taken 'frightful quantities of medicine,' calomel especially. The attacks ceased 12 years ago, and were replaced by extreme flatulency, which would last sometimes 14 days, and leave her free as long. At this time she had spasms in the stomach, called gout by medical men, and once some show of it in the feet. Her left arm was in real "agony" during 6 months while she was suffering from flatulence with a kind of neuralgic tic. The flatulency continues now to some extent, and is attended with yawning, which recurs very often, she has counted as many as 50 or 60 acts. Epigastrium is extremely tender. Has been dieted carefully, but without advantage. Lung sounds tolerably healthy. Heart's sounds are weak, but free from murmur, rhythm irregular. Urine, sp. gr. 1031, contains an excess of urea, crystallizing copiously with half its volume of NO_5. When collected 3 days later during 24 hours the quantity was about 35 ounces, the sp. gr. 1026, it deposited uric acid in abundance spontaneously, and the total amount of urea was 630 grains. I gave her Strychnia with Muriatic acid, Liq. ferri Muriatis and Chloric Ether, with which she became decidedly better. When I next saw her, Dec. 8th, her neurotic disorder had taken the form of noisy and difficult breathing, without any expectoration, tightness of chest, or inability to lie down.

I believe the sick headaches, the primary malady, depended directly on brain disorder, the organ being no doubt congenitally weak. The flatulency which replaced them had, I consider, its seat in the solar plexus essentially, the change consisting in the transference of morbid action from one centre to another. The repeated dosing with calomel was most unfortunate, impairing still further the originally feeble nerve-power. The occurrence of pain in the left arm coincidently with the flatulency is remarkable, and indicates clearly that the solar plexus disorder extended backwards and involved the spinal centres at the origin of some of the brachial nerves. The renal nerves were involved in the disorder in the case of S. W—, the amount of urea excreted being evidently excessive. One of the principal remedies which I employed in this case is spoken of very favorably by Dr. Wilson Fox in his excellent work on 'Diseases of the Stomach.' He says of Nux vomica or Strychnia that it "often proves a most valuable tonic remedy, improving, apparently, the nervous energy of the stomach as well as that of the system at large. Thus in many cases, by increasing the muscular contractility of the stomach and intestines, it aids (in addition to the antiseptic effects common to all bitters, but largely possessed by strychnia) in preventing the distension by flatus, which is so common and distressing a symptom in the cases now under consideration" (p. 113).

The relation existing between flatulency and nerve disorder is well shown by a case of masked ague under Dr. Copland's care. The disorder was intermittent, and the quantity of flatus eructated daily from noon to 3 or 4 p.m. was enormous, the patient continuing to belch without intermission. The same connection is also very evident in the following instance.

Case 28.—M. A. L—, æt. 34, an overworked mother, who had suffered for years with neuralgia in the face and head, was admitted June 14th. Her prominent symptoms were severe left-side pain, palpitation of the heart, and very frequent, sometimes continual, eructation. The least exertion brought on the pain and increased the flatulency. The latter was not at all affected by food, was neither better nor worse after a meal. She had no marked indigestion. Some nights she woke up with much palpitation and alarm. She was not amenorrhœal or anæmic. Subcutaneous opiate injection and tonics were of some avail, but she derived most benefit from a pill of Argenti Oxydi gr. j + Opii gr. ½ + Zingib. gr. ½ + Creasoti ♏j *ter die*, which, by the way, did not explode. When she was better she could walk about the ward without eructing, but when worse even sitting up in bed brought it on. After she had improved a good deal a short ride in an omnibus to get her pass for the Walton Asylum caused her palpitation and flatulence all the next night. In this instance the sensory nerves of the left side of the thorax, the cardiac nerves, and the gastric, were all involved, and all affected in the same way. No doubt the real seat of disorder was in the tertiary centres of the left side of the upper dorsal cord, and in the quaternary of the heart and stomach, the cardiac ganglia, and solar plexus. The pathological situation was debility, engendering hyperæsthesia of the suffering nerve districts. The common explanation of such cases, that they depend on dyspepsia, is, I am sure, often untenable, and was certainly so here, as the supposed cause really did not exist.

A similar case has been recently under my care in which the patient, an energetic male, æt. 41, suffered extremely from flatulence and acidity of the stomach, with consequent palpitation and cerebral disorder. He has obtained very much relief from subcutaneous injection of opium. This has been performed twice at an interval of 9 days, and the good effects have not been merely transitory.

My next remarks have reference to cases of a much more serious kind, where there is actual obstruction to the onward passage of the contents of the intestinal canal. It is, of course, presumed that no structural change in the coats of the bowel, such as cancerous stricture or unrelaxing incarceration, exists, which would render all remedies fruitless. It is, however, conceivable that in minor degrees of incarceration the intestine might be enabled to escape if its peristaltic activity in the imprisoned part could be aroused so as to enable it to writhe out of the confining loop, or in other cases to untwist the strangulated folds of mesentery. The cases, however, to which the remedy seems most applicable are those where, from disordered innervation, a certain length of the bowel has become paralysed and distended, and is no longer able to propel onwards the accumulating contents. Here a means is wanted which can rouse the paralysed part to activity, and such we possess in Strychnia. Opium, whose value is also recognised in these conditions, acts, I believe, in the same way. As we shall see that it contracts the muscular walls of vessels, it appears the more probable that it may have the same effect on those of the intestine. Dr. Brinton testifies that "opium may certainly be pushed to the verge of producing complete narcotism without any diminution of this agonising straining peristalsis" which is so marked in some cases of obstruction.

The following cases are of interest.

Case 29.—Mrs. G—, æt. 63 about, fat and flabby, with weak digestion, pulse habitually irregular, seen in consultation with Mr. Morgan. Was attacked with pain in the bowels on 21st, after taking some indigestible food. Mr. Morgan saw her on 22nd, and gave Calomel + Opium, and afterwards aperients, but the pain was unrelieved, and copious vomiting of stercoraceous fluid stuff continued all the 23rd, and was very considerable when I saw her September 24th. She had been taking Opii gr. $\frac{1}{2}$ 3*tiis horis* during the last 10 or 12 hours, and was fully under its influence; the pupils were very small indeed; but the pain in the abdomen was unrelieved, the bowels had not been moved at all, and the belly was much distended. The pain in the abdomen was all over it, not specially in one part. The countenance was not anxious. Tongue coated. The urine was lateritious and pretty copious. The large intestine received about a quart of injection, showing that the blockage was not low down. We continued the opium 4*tis horis*, and gave besides Strychniæ gr. $\frac{1}{20}$ + Acidi Nitrici ♏iss + Spt. Æth. Chlor. ♏viij + Aq. ℥ss 4*tis horis*. The vomiting subsided during the day, and in the night the bowels acted with a gush; two fæcal evacuations were shown us at our visit on the morning of 25th. The pulse, which was the previous day over 100 and not notably irregular, was now about 70 and very irregular; the abdominal pain had gone, the abdomen was flaccid, soft, painless, bore pressure well. After this recovery went on, though interrupted by extreme tympanites for a couple of days, which yielded to a full dose of Calomel and Aloes, followed by Nitric with Hydrocyanic acid. It is not quite clear, perhaps, in this instance whether it was the opium or the strychnia which restored the normal action of the intestine. However this may be, it is clear they did not interfere with each other, and in cases where there was much pain it might be always well to associate them together.

In the following case I cannot doubt the efficacy of the Strychnia.

CASE 30.—Miss J—, of mid-age, crippled by rheumatism, and subject to neuralgia, had been operated on for cataract by a most able ophthalmic surgeon. Spasm affected the muscles of the globe soon after the operation, and was attended after 3 days with neuralgic pain in the eye, chin, and neck. Three days later she became dangerously ill with violent spasms of the bowels and obstruction. Purgative pills and castor oil had no aperient effect, but induced vomiting, and the abdomen was a good deal distended. I saw her the 7th day after the operation, and advised Strychniæ gr. $\frac{1}{16}$ in solution *ter die*, an ointment of Opium and Belladonna to be rubbed on the distended (and, I think,) painful abdomen, and a mixture containing chloroform and paregoric to be taken if the spasms returned. I have no complete records of the case, which occurred many years ago, but I remember that the abdomen subsided and became easy, though no evacuation took place for three days, during which the strychnia was continued. An aloetic pill was then administered, which brought away a great quantity of offensive, dark fæcal matter, and the disorder was at an end.

This case illustrates (1) the evident connection of the obstruction with a disordered state of the nervous system, marked by a tendency to neuralgia and spasm; (2) the inutility, not to say injuriousness, of mere purgatives; (3) the good effect of a nervine tonic, which, while it restored capacity of action to the bowel, did not excite peristalsis; (4) the necessity of soliciting this ultimately by a mild aperient. In most instances, I entertain no doubt, the purely sedative, or sedative and tonic, or tonic treatment, should be pursued at first, and purgatives should be avoided. But sometimes it answers well to administer the nervine and the aperient together, as in the following instance.

CASE 31.—F. M—, æt. about 25, sent for his medical attendant early on July 3rd on account of an attack of colic (so called) from which he was suffering. After the pain was relieved he had black draught, and subsequently a full dose of Colocynth, with some calomel, and enemata, without any effect. Seven days had elapsed, when I saw him on 6th, since he had a proper alvine evacuation. He was then apyretic, was thirsty, but not without appetite; passed rather a small amount of urine. Pulse 87. Abdomen bore pressure well, but there was some soreness or uneasiness felt occasionally to the right of the umbilicus, it was resonant everywhere. The lower intestine seemed to have been cleared of its contents by the enemata, which at last brought away nothing. The heart, liver, and spleen appeared normal. It was agreed that he should take a pill consisting of Extract. Nucis Vomicæ gr. $\frac{1}{2}$ + Extr. Belladon. gr. $\frac{1}{6}$ + Pulv. Aloes gr. iij in pil. 4*tis horis*. The abdomen was to be rubbed with a liniment of Tr. Jalap. + Lin. Sapon. After he had taken 8 pills the bowels acted freely in the course of the night, and on 9th he returned to his avocations. About a year or so later I saw this gentleman again. He was then experiencing some uneasiness on the same side of the abdomen, but lower down, near the situation of the internal inguinal ring. I suspected there might be incipient hernia, and procured a surgical opinion as to the matter, which was that there was no evidence of any actual protrusion. Ultimately, however, a truss was applied and put his uneasiness to rights. I am rather inclined to connect the two attacks of disorder, and to think that in the first some degree of incarceration took place, from which the intestine was extricated by exciting it to more vigorous peristaltic action. In admitting that purgatives *may* be useful in obstruction of the bowels, I am as desirous as any one can be not to abuse them, and should altogether avoid them if there existed evidence of inflammation, or of actual ineffectual peristalsis. Dr. Abercrombie was certainly no stranger to the good effects of opium and to the need for discretion in the use of purgatives, but still he approves in general of the repetition "at short intervals of moderate doses of mild medicine, such as aloes combined with hyoscyamus."

This seems an appropriate place to offer some remarks upon Cholera. The view I take is that the fatal symptoms are the result of intense intestinal irritation, which tells with deadly effect on the nervous ganglia of the heart, and to a less extent on the spinal, but leaves the encephalic undepressed, or rather seems to stimulate them unnaturally. The fact that persons in full collapse and pulseless often have their intellect clear, and are able to make muscular efforts, and even to walk about, clearly implies that the nerve force in the intellectual and motor centres is much less dependent than usually on the blood-flow, and therefore must be abnormally exalted. Dr. Murray considers the characteristic symptom of the malady to be paralysis of the sympathetic, but though this state probably does exist in the nerves and ganglia lodged in the intestinal coats, the phenomena observed in other parts, the cramps, lividity, coldness and speedy failure of pulse, are very indicative of irritation of other nervous centres, and this conception, I think, should rule the treatment. The case related by Dr. Greenhow (v. 'Med. Times and Gaz.,' 1866, August 11) seems very proving as to this point. An old lady took by mistake an embrocation containing ♏xxx of Croton oil. Two hours after, she had all the appearance of a person in the cold stage of Cholera. There had been very profuse watery purging exactly resembling the rice-water stools of cholera patients, the surface was cold, the features shrunken, the fingers shrivelled, the skin even more blue than is usual in cases of true cholera, and the pulse was thready and almost imperceptible. The patient had severe cramps, she was very restless, and her respiration was gasping. Her intellect was unimpaired. She died 10 hours after taking the poison. The fact now pretty well ascertained, that stimulants are injurious in cholera, is consonant to the view I advocate. In states of primary sympathetic paralysis, as in low fever, they are beneficial, but in cholera they probably increase the already existing irritation. The same view explains why Ol. Ricini has sometimes produced a good effect. This substance seems to have a soothing action on irritated mucous membranes, and may be regarded as nearly the same sort of application to the intestinal surface damaged (I might almost say scalded) by the cholera process, as Carron oil is to the skin in cases of burn. Calmatives, such as Bismuth and Lime-water, internally, I think, are the most rational means, though where the lesions produced are very severe it is not probable that anything will avail.

CHAPTER XLIII.

NEUROSES OF THE LOWER INTESTINE.

The rectum is by no means a common seat of neuroses in this country at least. The only forms I have myself met with, and these perhaps rather belonged to a higher part of the bowel, consisted in serous, flatulent, or bloody discharges occurring under circumstances which made their dependence on nerve disorder highly probable. The following case is a good example.

Case 1.—C. R—, æt. 23 (?), seen July 3rd. Has been invalided and sent home from India on account of dysenteric diarrhœa, has now been at home about a year. The diarrhœa has almost ceased under Sir R. Martin's treatment, but the bowels are very easily disordered, a glass of bitter beer will act as a purge. The motions are apt to become lumpy and pale. The chief trouble he has now is great flatulence passing *per rectum*, it will come on quite suddenly and be very troublesome for some time, it mostly occurs some time after dinner. He is pallid and has lost much flesh. During a recurrence of dysenteric diarrhœa while under my care the flatulence quite ceased. Some months later the neurosis came on earlier in the day, after luncheon, and not after dinner. He would then have uneasiness in the bowels, some tendency to relaxation, and pass a lot of wind. Still later, when the flatulency had almost left him, he found that it always returned whenever he became weak and prostrate, which was the case now and then. The last note I have is that the flatulent disorder came on every night exactly at 10 p.m. and lasted fifteen minutes. He could take beer and even champagne well, and had materially gained in strength. The most efficient remedies were pills of quinine + opium + creasote + pip. nigr. *ter die*, tannin + opium in pills, pepsine wine, and abundant out-door exercise.

I believe it is considered by some of our best authorities as highly heretical to hold that mucous membranes can secrete gas. I must confess that I cannot explain such a case as the above without admitting that such secretion may actually take place. In a very similar instance, but of much shorter duration, towards the termination of the disorder, the diarrhœa, which had been markedly paroxysmal, gave place to quite similar bursts of gastric or intestinal flatulence. It seems as if one might almost speak of a gaseous diarrhœa.

Case 2.—Tr—, æt. 40 (?), a fine-looking, well-conducted, but not very strong soldier, acting recently as drill-sergeant to a volunteer corps. Was in the Crimea, had good health all the time. Never had any kind of fever. Latterly has lost much flesh and got very weak. Lungs rather emphysematous, otherwise sound. Heart sound. He suffered first with sudden attacks of palpitation and great debility, subsequently he had symptoms of gastric catarrh and paroxysms of severe gastralgia. While improving he began to pass blood *per anum*; the first day he passed Oij, he thinks, and continued to do so in varying quantities for some days. The abdomen was full, soft, resonant all over, but less so in the left hypochondrium than elsewhere, the hepatic dulness was diminished in extent. A feeling of weight and pain which he had had in the lower part of the abdomen ceased after the bleeding. He had no piles. Under the use of lead + opium the bleeding ceased, and with quinine and change of air he recovered. His health has since been fairly good, and he has only once had a very slight recurrence of bleeding.

Remarks.—The cause of the hæmorrhage in this instance is doubtful, but I think one may exclude piles, dysenteric and tuberculous ulceration, and malignant disease. Had any of these existed there would almost certainly have been prior symptoms, and the hæmorrhage would have recurred. On the other hand the existence of marked neurolytic disorder and the previous exposure to malaria make it not improbable that congestion of the lower part of the colon or rectum, with atonic relaxation of the capillaries, may have given rise to the bleeding.

Case 3.—S. Sp—, female, æt. 27, admitted September 14th. During the last week has been suffering more or less pain in stomach (abdomen probably) accompanied by diarrhœa, of which she took no notice; was purged yesterday several times, and early this morning was seized suddenly with severe pain in stomach with somewhat violent retching. On her admission she was cold, surface clammy; she complained of intense pain in the abdomen. Pulse weak and frequent. Ate some plums and apples last night.

Calomelanos, camphoræ, opii, capsici, āā gr. ½, ft. pil. post *sing. sedes liquid.* Mist. pot. citrat. efferv. ℥j + Acidi hydrocy. dil. ♏v 2*dis horis.*

The sickness was arrested, the next day she passed a motion containing large coagula of blood. 16th.—Passed more blood in motions last night; much pain in abdomen, increased on coughing. Twelve leeches were applied to the belly and relieved the pain very much. She took also the above pill *ter die.* 19th.—No blood last two days in stools, only some feeling of soreness now in abdomen; has begun quinine. She went out well.

Remarks.—This case occurred during the prevalence of epidemic cholera, and was clearly the result of the miasm. It is impossible to say what were the causes which determined the occurrence of hæmorrhage rather than of serous discharge, but it is evident that there must have existed great congestion of the mucous membrane, probably of the large intestines. Extreme capillary congestion and extravasation of blood were observed by Reinhard and Leubuscher in some fatal cases, especially in the ileum. One part at least of this congestion must have consisted in dilatation of the arteries of the mucous membrane, and another in loss of tone of the capillaries, both probably the results of nervous paralysis. That the choleraic poison acts especially on and through the nervous system is, I think, unquestionable. The remarkable and peculiar depression, the algide symptoms, the cramps, the sudden prostration and death occurring sometimes without any diarrhœa, all testify to this fact.

The following case from Torti is well worth perusal in reference to this subject.

Case 4.—A garrison soldier of our city in the third paroxysm of a tertian fever passed a dejection extremely blackish, as it were made up of blood partly coagulated and partly dissolved. It resembled somewhat a copious flow of hæmorrhoidal blood; but the black colour, and its being thoroughly mixed with excrements of softer consistence, showed that it came from higher up. The excretion was also (at times) clear and unmixed with fæces, quite like the black blood called by the ancients atrabile. Very copious was this discharge, frequent, and violently ejected, the countenance at the same time became Hippocratic, the extreme parts cold and livid, the whole body corpse-like, the pulse almost abolished, while the patient lay buried rather than swimming in a pool of this foul fluid, from which he endeavoured to free himself with vain efforts and restless tossing to and fro. As quickly as possible all the sacraments of the Church were directed to be administered, and then the Peruvian bark in strong doses, though almost without hope. The next morning the patient was still alive, but utterly prostrated, still rather cold, and with a most feeble pulse. The use of the remedy is continued according to my practice in a smaller dose, and this alone and food is prescribed. On the following day an exceedingly mild attack occurs, and in it the pulse begins to rise (in force) and the body gets somewhat heated, while there is no return of the black dejections. The patient advanced towards health every day after, had no further relapses, and completely recovered, the bark being continued by way of prophylaxis for some days.

Frerichs states in his section on the pigment liver (v. Syd. Soc. edit., p. 346, Vol. I) that he has met with intestinal hæmorrhages on three occasions; the bleedings were intermittent, and came on each time with the paroxysm of the fever; they were not affected by any treatment of a styptic kind, but yielded to large doses of quinine. As the pigment is deposited in the capillaries and small vessels of the liver it may be thought that the hæmorrhage is simply the result of obstruction, as in cirrhosis, which occasionally gives rise to profuse and fatal hæmorrhage. But if this were so the bleeding ought to be continuous, not intermittent and coincident with the febrile paroxysm, and quinine could not be curative. The view I take is that the paralysis of the vaso-motor nerves prevailing during the paroxysm impairs in certain parts of the intestinal mucous surface the retentive power of the capillaries, which then give way to the force of the current pouring in through the dilated arteries, and so blood escapes in a greater or less amount. In the same way I explain the occurrence of profuse diarrhœa, not unfrequently passing into dysentery, and effusions of serum into the peritoneal cavity, which Frerichs observed under the same circumstances. This author finds that cerebral disturbances may be absent when the brain is dark with pigment deposit, and present when there is no pigment deposit, and I cannot but suspect very strongly that the same is the case with the liver.

There can be no question in a case of this kind that the hæmorrhage was not the result of ulceration.

Case 5.—Mrs. A—, æt. 50, female, a finely made florid person, of highly nervous temperament, but little strength. Her catamenia have occurred every fourteen days since girlhood. If she gets the least cough expectorates blood. Ten years ago had copious hæmatemesis, brought up a basinful. When young has been bled many times without benefit. She had constantly recurring slight eczema, which did not yield to the usual treatment, and as she appeared full-blooded I took on one occasion ℥vj of blood from the arm. It weakened her considerably for some time, and did no good. She has several times had copious bleeding *per anum*, which, as far as I could judge from an examination I made during one of these attacks, did not proceed from piles. There was diarrhœa at the same time, and tenderness over the descending colon. Tannin + opium, with lead enemata, arrested the hæmorrhage, but it recurred at intervals a long time afterwards, and probably does so still.

The circumstances which dispose me to regard the above case as an instance of intestinal vaso-motor nerve paralysis are (1) the occurrences of hæmorrhages from four different surfaces at various times; (2) the marked want of tone and nerve power; (3) the marked plethoric aspect of the patient in spite of all the frequent losses of blood; (4) the good effect of strychnia which she has repeatedly taken with great advantage. It appears as if the quantity of blood frequently became disproportioned to the retentive power of the vessels, in consequence of which rupture and extravasation occurred. The state of the system resembles that of the so-called "hæmophilic" or bleeders. Besides the tendency to hæmorrhage the only other marked peculiarity is the hyperæsthesia and nerve debility. It may be an error to regard the vascular and nervous weakness as causatively connected, but there are certainly some grounds for the opinion. Thus, I have had evidence again and again that cutaneous purpura is essentially the result of debility, and not of privation of vegetables, and I have more than once seen extravasation of blood take place under the conjunctiva solely as the result of neurolytic prostration. Scurvy is said to have appeared among some American troops, and to have proved fatal in some cases, which appeared to be induced chiefly by *ennui* and home sickness (v. 'Amer. Med. Times,' 1861, June 1st).

Mr. Ashton in his work on 'Diseases of the Rectum' thus describes neuralgia in this situation. "The disease is most frequently met with in anæmic individuals, in whom the nervous sensibility is generally excessive and often deranged. Females whose systems have been depressed by menorrhagia, or child-bearing, particularly if the labours have been attended with violent floodings, are liable to become the subjects of this disease, as well as of other forms of neuralgia." The quality of the pain varies in different persons and at different times; it is sometimes constant, more often remittent. As to its origin Ashton describes it as either reflex from some cause of irritation in other parts of the alimentary canal, or as induced by exposure to cold and damp, as in sitting on cold wet stones, or by the influence of malaria. He relates an interesting case in which the patient had been engaged harvesting in Essex, and had been exposed to the night air. He complained of great pain at the fundament occurring daily, and continuing for some hours, not induced or aggravated by defecation. No lesion of any kind was discoverable. The local application of belladonna failed, but with quinine he soon recovered.

It may be worth mentioning here that in some persons prolonged exercise on foot, as in a walking tour, causes a paretic condition of the rectum. The fæces accumulate above the sphincter in large, hard masses, which cannot be expelled without much straining effort, attended with pain, and sometimes slight laceration of the mucous membrane. The general health is not interfered with. The constipation disappears after a few days' rest. I can only attribute it to a temporary deficiency of nervous power in the mucous and muscular coats of the rectum, which become comparatively insensible and paretic. The deficiency is occasioned by the excessive demands made by the muscles of the lower limbs and other parts concerned in walking. Syncope from fatigue is another instance of the same kind, and both illustrate very well the possibility of the diversion of nervous power from one part to another. The affection is not, I suppose, common even among pedestrians, but to any who may experience it we may recommend as a palliative a warm water and soap enema (if it may be had) and, as a cure, rest. Such constipation as this illustrates very well the nature of that which often plagues studious men and others who have much brain work. The large intestine becomes torpid, as in the former case, from deficiency of nervous power, but the consumption now takes place not in the limbs but in the brain itself.

CHAPTER XLIV.

NEUROSES OF THE URINARY ORGANS.

The urinary apparatus seems to be less liable to suffer from neurotic disorder than the digestive. It is, however, by no means exempt, as the following pages will show.

Irritability of the bladder, not dependent on catarrhal inflammation, or on morbid conditions of the urine, may be considered probably equivalent to hyperæsthesia of its mucous lining, or, more properly, of the sensory nerves of this membrane. Just as an hyperæsthetic stomach is intolerant of food, so is the hyperæsthetic bladder of urine. Such a state is, I think, not very common. Sir B. Brodie, however, recognises its existence, and compares it to that which in some persons causes constant winking of the eyes or twitching of the muscles. The tendency to frequent micturition, when once begun, is kept up by habit, and it may require some voluntary effort on the part of the patient to overcome it. The nocturnal incontinence of urine which affects children, and continues sometimes into adult age, is another form of idiopathic irritability of the bladder. The malady may be of toxic origin, depending on the causes of gout and rheumatism respectively in different cases. Also it may result from remote irritation, as from scybala in the bowels, or calculi in the kidneys, or teeth pressing on the gums. Mr. Coulson mentions two cases in his practice where a contracted preputial orifice proved to be the cause, as was shown by the cessation of the disorder after circumcision. The seat of the irritation in these instances was the glans and the mucous surface of the prepuce. Mr. Tufnell relates a case, the subject of which was a man, æt. 37, where excessive irritability of the bladder, spasmodic stricture of the urethra, tenesmus, hæmorrhoids, and dyspepsia, proved to be dependent on a tapeworm in the intestines. Remedies had relieved him twice, but the symptoms recurred severely until the parasite was expelled by a dose of turpentine and castor oil. The urine, which previously had been highly acid and lateritious, became clear and healthy.

Very few autopsies of such patients as are now referred to have been made. Mr. Coulson mentions having examined the body of a gentleman of a very nervous temperament, who had long suffered from irritability of the bladder, and died of disease of the lungs, but he could not detect the least alteration in the appearance or structure of the bladder or of any of the urinary organs.

The treatment of vesical hyperæsthesia must, of course, depend very much on the view we take of its cause. If the disorder be analogous to chorea, the indication is to have recourse to tonics, and all such means as can invigorate the nerve power. Some practitioners, I believe, have in peculiar cases employed artificial distension with good effect. Certainly the patient should be encouraged to resist the tendency to micturate as soon as the call is felt as much as possible, and should try, by changing his posture or by active movement, to divert into other channels the morbidly excitable nerve force. If the disorder depend on gout, small doses of extract of colchicum at night, and Carlsbad water (half a pint of Sprudel) every morning will probably be effectual. In rheumatic individuals Potass. Iodid. and Phosphate of Ammonia are suitable remedies. Remote irritation, when discovered, can mostly be removed. If none exist we may have recourse to Belladonna as a general remedy, and to Opium as a local. The nocturnal incontinence of children or adults is remarkably controlled by the former drug. Trousseau relates the case of a girl, æt. 19, who regularly wetted her bed twice every night, but, by the persistent administration of belladonna, increased from gr. $\frac{1}{5}$ of the extract to gr. ij, given every evening, and continued for many months, was at last completely cured. Relapses must be expected to occur again and again after improvement has commenced, but by due regulation of the dose, and keeping the system steadily under the influence of the remedy, the morbid tendency is overcome. Dr. Behrend ('Lancet,' June 25, 1859) relates the case of a lady, æt. 30, without family, who suffered for 16 months with great irritability of the bladder, compelling her to rise from 3 to 8, or even more, times in the night. The urine then passed was pale, insipid, but otherwise normal, except that it was 2 or 3 times as copious as in health. She had lost flesh, and suffered much from thirst, headache, and nausea, especially on rising in the morning. Her spirits were much depressed. During the day there was little or no irritability, and the quantity of urine was nearly normal. Tr. Ferri Muriatis, Valerian, mineral acids, liquor potassæ, sea bathing, change of air, were of no avail, but belladonna given ultimately in a dose of gr. ½ of the extract in the morning and gr. j at 9 p.m. effected speedily an almost perfect cure, which remained permanent, although the remedy was at once discontinued after it had produced its physiological effects. The vesical hyperæsthesia in this instance seems to have extended to the renal nerves, and to have given rise to the increased flow of watery urine. Hysterical hyperæsthesia has the same effect. Here we have more examples of nerve disorder altering the retentive power of the capillaries. Mr. Hilton states in his lectures, p. 265, that in cases of irritable and painful bladder his colleague, Mr. Cock, has long been in the habit of injecting sedative solution of opium into the interior of the bladder with great advantage to the patient's condition, and says that he has repeatedly observed the good effect arising from such a proceeding himself. He gives the history of a case of chronic cystitis under his own care, which was much relieved in the same way. Dr. Hicks advises that the quantity of fluid injected be small, not above ʒss or ℥j at most, and the dose of morphia not less than gr. j. The tube should not actually enter the bladder, as if it touch its sensitive walls much pain is given, but the injection should be urged with sufficient force to pass the sphincter.

In the two following instances the irritability of the bladder was associated with suspicious signs of azoturia, though I by no means affirm that this condition actually existed.

Case 1.—H—, male, æt. 35, seen July 15th. He complained of aching uneasiness in the loins, which he had had since the previous winter, with great general debility and nervousness. The hyperæsthesia was still very considerable. Appetite poor. He was chiefly troubled by a nervous feeling referred to the bladder, leading him to imagine that he wanted to urinate, though he had no real call to do so. If he was at all hurried he could not urinate at all. This vesical dysæsthesia he had had for years. The urine was highly acid, sp. gr. 1036, contained an excess of urea, and deposited lithates and some oxalates. Nitro-muriatic acid + liq. Opii failed to benefit, but Strychnia effected a cure. The urine on August 6th, after he had taken the Strychnia 5 days, was of sp. gr. 1021, of normal colour, and deposited no uric acid nor oxalate in 24 hours. The next year he had a return of the same symptoms, and Strychnia, with citrate of iron and quinine, was effectual. An occasional opium suppository was also useful in calming the vesical uneasiness.

Case 2.—Mrs. D—, æt. 45, seen October 26th. Of broad, stout build; has always been nervous and subject to quasi-hysterical disorder; has had eczema and rheumatic gout. Complains at present of pain in the sacral region and in that of the vulva, with irritability of the bladder, which causes her to get out of bed 3 or 4 times a night. Sometimes she passes urine very frequently indeed. Riding in a carriage makes her worse, and so does walking for more than a short time, it brings on increase of the sacral and pelvic pains. The urine is at present of medium colour, deposits lithates and some oxalates, crystallizes copiously with Nitric acid, is not saccharine or albuminous; its quantity is rather small. A physician who saw her some time ago was so convinced of the existence of stone, that he took an eminent surgeon down into the country to operate; but after 2 hours' close examination of the bladder nothing could be detected. Occasionally a large hæmorrhoid has protruded from the bowel, but this only happens about 3 times in the year. She has no pain at stool; her bowels are irregular, either relaxed or costive. Uterus normal.

In this latter instance the kidneys and the bladder were both affected by irritation, probably of gouty origin.

Neuralgia of the bladder is allied to, but not identical with, hyperæsthesia. Bourguignon has specially described it (v. 'L'Union Méd.,' 1861, Nos. 33, 35), and states that it is produced by exactly the same causes as give rise to neuralgias elsewhere. Rheumatism is the most frequent of all, especially when induced by chilled feet. The neck of the bladder is the especial seat of the neuralgia, and the symptoms are pain, frequent calls to urinate, and tenesmus (spasm) of the sphincter. If the disorder is of rheumatic origin the urine generally deposits lithates; if not, it is copious and clear. Long continuance of the neuralgia may lead to paralysis of the muscular coat of the bladder. In aggravated cases spinal and cerebral symptoms ensue. In the way of treatment he recommends sedatives locally and internally, alkalies if the urine is over-acid, tonics, and electricity. Hamon advises superficial cauterization of the skin of the hypogastrium by nitric acid, and the repeated introduction of the catheter. The following case may be referred to this head :—Miss G—, female, æt. 30, seen February 19th, complaining of some irregular action of bowels, but chiefly of irritation of the bladder, and frequent micturition, and of feeling nervous and weak. With citrate of iron and quinine + tr. nucis vomicæ + liq. opii sedat. she improved materially in the course of a month, though some dysuria still continued. May 19th.—She came under my care again for very severe dental neuralgia, which came on just after a double tooth was drawn 6 weeks before. The pain was incessant, but worse at night, and had deprived her of rest for many nights. She had, however, felt bodily well since the pain had been so severe.

With quinine + iron she improved speedily, and no complaint was made of the dysuria. In this case the severe dentalgia, which was evidently not dependent on diseased teeth, serves as an exponent of the nature of the dysuria. Both, in fact, were simple neuralgias, and the latter seems to have been absorbed by the former. Mr. Erichsen's testimony to the occurrence of neuralgia of the bladder is very decided; he describes it as either primary, occurring especially in hysterical or hypochondriacal patients, or else sympathetic with, and depending on, disease at a distance, as in the kidneys, uterus, rectum, &c.

Neuralgia of the urethra is spoken of by authors, and may sometimes occur, but it must be rather rare, and it must certainly be difficult to be sure that no structural lesions are present. This might be ascertained with the endoscope. Mr. Child relates a case occurring in a man who had contracted gonorrhœa 3 years previously. Since that time he was never free from pain, and occasionally there had been a white gluey discharge. There was no stricture. Nitrate of silver freely applied to the urethra afforded much relief, and the application was repeated 3 or 4 times. The following prescriptions relieved him perfectly in 5 weeks. ℞ Tr. Lyttæ ʒj + Tr. Ferri Muriat. ʒij + Quin. Disulph. gr. xij + Acid. Sulph. dil. ʒj + Aq. Destill. ℥iv. M. capiat ℥j *ter die*. He also took Morph. Muriat. gr. $\frac{1}{4}$ + Extr. Conii gr. iv *o. n.* M. Vidal de Cassis describes severe persistent pains occurring in the course of the urethra as not unfrequent sequelæ of gonorrhœa after all traces of discharge have completely ceased. These he treats by moderate compression of the penis with strips of plaster applied so as to encircle the organ, but not, of course, so tightly as to prevent micturition. This proceeding affords a perfect cure in many cases, and marked alleviation in others. The compression should be continued for a considerable period after the cessation of the pains, to prevent their return. One would think that a sort of finger-stall contrivance made of elastic webbing would be preferable to the plaster.

Dr. Ashwell describes, under the name of *chronic urethritis*, a pathema in females which seems to contain at least a large amount of a neuralgic element. Its principal and most distressing symptom, he says, is a burning along the whole course of the urethra, not only after micturition, but entirely independent of it, and continuing for many hours with great severity, but in a mitigated degree, for days together. It is very rare, but Dr. Ashwell had seen 4 marked and really bad cases, and never heard patients complain more bitterly of any suffering. One lady had not known entire ease for years, as, during the whole of this period, excepting when asleep, she had never been entirely free from the dreadful burning sensation which is its principal symptom. In one case minutely investigated by various eminent men, including Sir B. Brodie, no other conclusion could be come to than that the malady consisted in an idiopathic diseased action of the mucous lining of the urethra alone. In another Dr. Ashwell mentions that he detected several ulcerated spots, and found that the worst pains were produced by the passage of the urine over them. The condition of the urine varies a good deal, and does not seem to me to explain the symptom.

Dr. Ashwell's experience leads him to believe that in aggravated forms of the malady mercury, administered so as to affect the system alone, can be relied on. In one very severe case all treatment failed until this was had recourse to. This would be about the last means one would ordinarily think of in the case of neurotic sufferers, yet it should not be forgotten that Messrs. Griffin have left it on record that in severe cases of spinal irritation mercury was certainly the most successful of all the remedies they made use of. They do not, however, seem to have used it largely, nor to expect it would be borne by all patients. A mild mercurial course was the mode employed (v. p. 240). In the less severe cases Dr. Ashwell found the application of a very strong solution of nitrate of silver on a sponge to the whole course of the urethra, followed by a strong solution of belladonna, to afford great relief. One patient preferred sometimes having the caustic alone, as, though the pain it caused was scarcely endurable for some hours, the subsequent benefit was greater than when the sedative was used. Dr. McClintock has met with cases whose symptoms were somewhat similar, which yielded readily to copaiba capsules. In these, however, the mucous lining of the canal was highly swollen and injected. I suspect these cases resemble strumous ophthalmia a good deal in the peculiar suffering being out of all proportion to any existing inflammation. In some, probably, this is more the case than in others.

The above have been mainly instances of sensory disorder; we will next take examples of motor. In a paper published in the 'Brit. Med. Jour.,' 1868, October 24th, Mr. Paget has remarked very instructively on the analogy between irregular, unharmonious action of the muscles concerned in articulate speech, and a similar condition of those concerned in micturition. I had best cite his own words. "Stammering urinary organs are not rare; and they may be known by observing sometimes in the same person the exact parallelism between the difficulty of expelling urine, and that of expelling the air in the ordinary speech-stammering. The patient can often pass his urine without any trouble, especially at customary times and places; and when he does so the stream is full and strong, and he has nothing the matter with him. But at other times he suffers all the distress that he might have with a very bad urethral stricture. He cannot pass a drop of urine; or after a few drops there comes a painful check, and the more he strains the less he passes; and then complete retention may ensue, and over-filling of the bladder. In these characters the case may closely resemble one of the ordinary instances of so-called congestive stricture in which rapid swelling of some part of the mucous membrane narrows or closes the part of the canal which is least capable of distension. But the circumstances in which the difficulty arises are in two cases very different. The stammering with the bladder occurs in just the same conditions as the stammering speech. There are few stammerers in speech so bad but that they can talk or read fluently when they are alone or with those whom they are most familiar with, or when they are entirely thoughtless as to their manner of speaking. Their worst times are with strangers, or with persons or in places that are associated in their minds with stammering. It is just so with the bladder and urethra. One patient told me that although he could usually pass urine well, yet there was one person with whom nothing could induce him to walk, because once, when he was with her, he wanted to pass urine, retired, and failed. His experience of the effects of association of thoughts made him sure that if he were again in the same circumstances the same distress would come on him more intensely. Another, a clergyman, always passed a catheter before going into his pulpit. He had often had nervous troubles with his bladder; and once or more, having felt a horrid need of passing urine while he was preaching, he found himself at the end of his sermon unable to pass any. He said he felt sure that if he were to go into his pulpit without the assurance of an empty bladder, which his catheter (a No. 12 passed easily) gave him, he should be pressed with the desire to pass urine, and then should have retention. As a speech-stammerer might be unable to utter a word, so would he be unable to pass a drop of urine. Again, another patient has described himself as driven to all kinds of devices to bring about the association of ideas or of actions with which he best succeeds in emptying his bladder. He must walk up and down his room, and stand or sit in some customary singular posture, and then be very careful not to direct his mind either too much or too little to what he has to do, and then to let the urine run as inconsiderately as he can." Mr. Paget's experience does not lead him to think that there is any risk of functional disorder of this kind passing into organic disease. Yet in his Lectures (Vol. I, p. 77) he speaks of the antagonising action of the compressors of the urethra as capable if unduly exerted of engendering hypertrophy of the bladder. Probably it is only in the worst cases when the opposing spasm is very great and frequent that this result is likely to occur. And even then it would be a conservative and not a morbid hypertrophy. Mr. Paget says nothing as to the state of the urine in such cases, from which we may almost conclude that it is not notably unhealthy. It should, however, always be examined, and the attention specially directed to the existence of azoturia, oxalate of lime deposit, or excessive acidity. As to treatment the points which he notices are (1) the training of the nerves and muscles of the urinary organs to steady action; (2) the evacuation of the bladder at regular hours; (3) learning to use a catheter in case of expulsive efforts failing; (4) attention to the general health.

Urethral stricture is a surgeon's subject. Yet, as (pure) surgeons often find it difficult to ascertain the proper limits of their demesne (some of them including therein pleuritic effusion, cerebral softening, and epilepsy), it may be permitted to a physician to allude to the abovementioned topic, chiefly by way of illustration, how considerable and persistent may be the symptoms of simply spasmodic stricture. Mr. Campbell de Morgan ('Lancet,' Vol. I, 1867, p. 453) records a case of this kind of more than 10 years' standing. The stream of urine had been very small; exposure to night air caused very frequent micturition, and latterly there had been muco-purulent discharge, irritation at the orifice of the urethra, pain in the perinæum, and tenderness in the scrotal part of the urethra. The obstruction was at the beginning of the membranous portion. No. 6 catheter, and then smaller and smaller instruments were tried, but none would pass. A large dose of Bromide of Potassium did not make a second or third attempt successful. A full-sized catheter, No. 11, was now used, and on slight pressure being made the obstruction gave way, and the instrument passed readily into the bladder. The same was done 2 or 3 times after, and the patient was sent home perfectly relieved from the symptom he had experienced so long. The case is a remarkable example how closely functional disease may simulate organic, and how much may be accomplished by judicious local treatment. It is very parallel to one of œsophageal stricture cited above from Mr. le Gros Clark.

Paralysis of the bladder may affect either the expulsor muscle or the sphincter, the results of course varying correspondingly. Both are in most cases dependent on organic disease of the cord, but may occur also as functional derangements. Various toxic agents may have the effect of causing paralysis. Monod relates the case of a woman, æt. 57, labouring under an incurable disease, who endeavoured to commit suicide by means of charcoal fumes. Her life was preserved, but an obstinate paralysis of the bladder remained, which was at last rapidly removed by galvanising the fundus and neck of the bladder. Romberg mentions ischuria (paralytic retention) as an occasional result of epileptic attacks. It may last several days. Rheumatism and arthritis, he states, are favorable to its production. The distension which occurs in low fever can hardly be the result of cerebral torpor only, for in other similar conditions the evacuation is passed in bed. It seems more probable that the one or other event depends on the circumstance whether the detrusor or the sphincter is most affected. Children labouring under Pertussis, Mr. Coulson states, are liable to retention. He mentions a case in which a pint of urine was drawn off from the bladder of a child, æt. 2½; after this the power of the bladder gradually returned. Over distension, in whatever way produced, is well known to cause paralysis of the expulsor, which may soon disappear, or last long, or even be permanent. The disorder here probably depends on undue stretching of the vesical, muscular, or nervous fibres, and can hardly be considered functional. It is worth mention that the distended bladder may (in the male) deviate considerably from its usual site. I once failed to diagnose a case of this kind because the tumour lay considerably to the right, extending down to Poupart's ligament and not to the pubes. The speedy increase in size of a tumour should always make us suspicious. Reflex paralysis of short duration, perhaps some days, is not rarely caused by the operation for the removal of hæmorrhoids, and occurred to some extent in a case of sciatica I have recorded.

Paralysis of the sphincter occurs as a functional disorder in the state of nervous prostration preceding impending sunstroke, in diurnal incontinence of urine in children, and probably in some other conditions characterised by failing power. One of the chief of these is senility, whether it be premature as the result of vicious excesses or in its due time. In the following case latent gout was doubtless the cause.

CASE 3.—J. F—, æt. 57, gardener, admitted September 4th, 1855. Rather short; emaciated lately. Has had gout 7 or 8 times, not every year, but nevertheless declares that he has always had 'the greatest of health.' During the last 3 weeks his urine has been constantly running away both by night and day. Bladder not distended. Urine quite clear, light-coloured, rather highly acid, not albuminous, or saccharine. Drinks tea largely, takes it even at dinner. He remained under treatment till April 2nd without any real amelioration of his urinary incontinence. I gave him ammonia, bark, quinine, iron, strychnia, ol. morrh., tinct. lyttæ at night, arsenic, zinc, opium suppositories, belladonna + quinine and cubebs. The belladonna did more good than anything else. About April 5th his right hand was attacked smartly with rheumatic gout, and immediately his vesical disorder entirely ceased, and had not reappeared when I last saw him, June 11th. He was galvanised twice without advantage.

Gout is well known as a tormentor of the nerves, and Cullen and Prout both allude to gouty irritation of the urinary organs. Strangury or spasm of the neck of the bladder, or irritability of the detrusor, seem, however, to occur more frequently than paralysis. In my case the condition was certainly chiefly paralysis of the sphincter.

This same state may be dependent sometimes on inhibitory irritation. Dr. F. B. Wood relates the case of a patient, æt. 14, who had been troubled from early childhood with incontinence of urine to such a degree that it was passing from the urethra almost constantly night and day. The penis had an elongated prepuce which was firmly adherent to the glans. After the performance of circumcision, and the removal of the adhesion, the incontinence entirely ceased (v. 'Med. Press and Circular,' December 8th, 1869).

The treatment, it is clear, must be ruled by our diagnosis of the cause. Strychnia, steel, and lytta, aided by Ol. Morrh., and, perhaps, Phosphorus, are our best internal remedies in cases where we judge there is simple failure of nerve-power. To these Romberg adds the baths of Gastein and Wildbad. Trousseau considers that if the incontinence is diurnal as well as nocturnal, and the urine is projected in a feeble jet, the whole bladder is paretic, and the administration of strychnia is indicated. Faradisation has approved its efficacy in the hands of several observers. It may be applied by means of Duchenne's double sound, or by introducing a catheter into the bladder, and placing a moist sponge attached to a disk on the surface of the sacrum. In the case of toxic agents or remote irritation I can add nothing to what I have said more than once.

The statement of Dr. Prout that a morbid condition characterised by *excessive secretion of urea,* together with symptoms of enfeebled nervous power, existed, after having been pretty generally neglected or discredited, seems now in a fair way of being verified, as a good deal of more complete evidence than Dr. Prout furnished has recently been adduced by different observers. Dr. Ringer's case was a middle-aged man, weighing 109 lbs., feeble, but not febrile, who passed in 24 hours (on a mean of 12 days) 1130 grains of urea, or 10·36 grains to each pound of body-weight. Dr. Roberts, who however speaks rather doubtingly as to the general question, relates a case, the subject of which weighed 120 lbs., and passed from 510 to 565 grains of urea daily, *i. e.*, 4·6 grs. per pound of body-weight. He had emaciated much and complained of debility, want of energy, and power of application to business. Mental anxiety was the cause of his malady, and is one of the causes mentioned by Prout. Dr. Fuller relates two cases which were accurately examined. The first was that of a man, æt. 43, weighing 149 lbs., suffering with symptoms of impaired nervous power, who excreted in 24 hours 830 grains of urea, or about 5·5 grains per lb. of body-weight. The second was also a male, æt. 37, weighing 142 lbs. who after a severe attack of fever, had suffered from disturbance of the digestive organs, and mental depression. He excreted 848 grains of urea in 24 hours, *i. e.*, 5·9 grains per lb. of body weight. The 6 following cases observed by myself are very similar to Dr. Fuller's.

Case 4.—Mr. F—, æt. 34, weight 174 lbs., fully 6 feet high, well made, with broad chest. Single, denies sexual excess. Of nervous temperament from childhood. Suffers from frequent epileptiform attacks in which he does not lose consciousness. Can walk 8 miles, but is much debilitated after exertion. Complains of nasty low nervous feelings with clammy state of skin. No pain after food. His urine = 48 oz., of sp. gr. 1028 in 24 hours containing 872 grains of urea, no sugar. The urea excretion per lb. of body weight = 5 grains.

Case 5.—Mr. S—, midaged, tall, spare, dark-complexioned, weighing 142 lbs., married, steady, not hard-worked. Ailing 3 years, suffers with great debility. Finds himself unable to do his work comfortably. Says he has bilious attacks from torpid liver. Urine passed in 24 hours = 25 oz., sp. gr. 1037 after a copious sediment of lithates has fallen; total urea = 608 grains. The urea per lb. of body weight is 4·38 grains. Total phosphoric acid = 35 grains, total uric acid = 10·54 grains.

Case 6.—Mr. M—, æt. 41, has been for many years in India, and in malarious districts, but never had fever, Ailing about 3 years with obscure nervous symptoms. Weight (naked) = 127 lbs. Urine of 24 hours = 44 oz., thick with abundant lithates, sp. gr. = 1021; total urea = 602 grains; total phosphoric acid = 37·3 grains; total uric acid = 7 grains. Urea excretion = 4·7 grains per lb. of body weight.

Case 7.—Mr. C—, æt. 45 (about), anæmic. but strong and capable of much exertion, a small meat eater, weighing 126 lbs., of very gouty parents, but himself as yet free from any decided symptom, unless various nervous troubles are, as is probably the case, an evidence of the lurking disorder. Is intolerant of tonics and even of minute doses of opium. He passed in 24 hours 33 oz. of urine, which crystallised into a solid mass with half its volume of Nitric acid. The total amount of urea was 673 grains, of uric acid = 7·68 grains. The amount of urea per lb. of body-weight was 5·3 grains.

Case 8.—Master R—, æt. 14, thin and pallid, a day-boarder at a healthy school. An uncle is diabetic. Is weakly, but has no disease of heart, or lungs, or abdomen. Appetite good, rather ravenous, has sinking sensations at the epigastrium. Is said to have had an attack of asthma recently. Urine palish, amount in 24 hours = 32 oz., sp. gr. 1023, total urea = 483 grains, it deposits a good deal of red sand. Weight = 75¼ lbs. The urea excretion = 6·37 grains per lb. of body-weight.

Case 9.—Mr. Co—, about mid-age, or younger, weighing 148lbs., looking well, hyperæsthetic and timorous in manner. He had suffered 6 years with a sense of falling in about the epigastrium, as if he broke in half; has also slight gleet, the result of gonorrhœa. He passed after being on treatment with strychnia and iron for some 15 days 70 oz. of urine in 24 hours, sp. gr. 1023, containing 1142 grains of urea, and 5·25 grains of uric acid. The amount of urea excretion per lb. of body-weight = 7·7 grains.

I should have been very glad if I could have added to the force of the above evidence by showing that with the return of health under the use of remedies, a corresponding change ensued in the state of the urine. Hitherto, however, I have not had any patient so docile as to enable me to carry out the object. In fact, it is difficult enough to get one 24 hours' amount of urine collected, and until much more sympathy is felt for attempts to improve medical science than appears to be the case at present, we must be content in the great majority of instances to act on probabilities without striving after an accuracy which is unattainable.

However, it appears to me that if we find the urine, say of the morning and evening, of high spec. grav. and crystallising with Nitric acid abundantly, if the patient report that the amount passed in 24 hours is tolerably large, or at least moderate, and if the symptoms present are such as belong to well-marked cases of azoturia, we have very reasonable ground for concluding that our patient's disorder is of this kind, and if, as will often happen, we are led by these considerations to successful treatment, we may be tolerably well satisfied.

The symptoms met with in azoturic patients are very various, but are all such as indicate failing power and disorder of various parts of the nervous system. Depression of spirits amounting in one of my cases to inclination to suicide, nervous fancies, wretched feelings, giddiness, pains in the back and various parts, sinking at the epigastrium, insomnia, irritability of the bladder, sometimes loss of sexual power, dyspepsia and flatulence, incapacity for exertion, extreme langour and weariness, have occurred more or fewer in actual cases, and may be expected to be complained of by sufferers of this kind. One great feature of the malady is its tenacity. I have recently seen two patients who first consulted me 10 or 12 years ago, and who continue still (having followed no regular treatment) in very much the same state. The high colour of the urine, and its being often loaded with lateritious sediment, may mislead the practitioner to think that he has to do with a congested state of the liver. I have witnessed this myself, and seen the good effects which ensued from the administration of opium and strychnia, which replaced the previously imminent mercurial ointment. Occasionally it has appeared to me as if gout was in some way related to azoturia, perhaps as a latent cause. I can hardly think, however, that the affinity is at all constant, or that gout plays here a more important part than we have had reason to think it does in many other disorders, of which we have recognised it as one among many motors. Dr. Fuller, however, states that no less than 11 out of 27 patients were the offspring of gouty parents, and 3 of them had actually suffered from gout. He is disposed to believe that the quantity of urea varies inversely as to that of uric acid, but has not made analyses to determine the point. In five instances where I ascertained the 24 hours' quantity of both ingredients, the per-centage of uric acid to urea was as shown by the following table:

	Urea.	*Uric acid.*	*Per-centage of uric acid to urea.*		
	GRAINS.	GRAINS.	GRAINS.		GRAINS.
R	532	7·5	1·41	:	100
Co	1142	5·2	·45	:	100
C	673	7·6	1·13	:	100
M	602	7·	1·16	:	100
S	608	10·54	1·73	:	100

From these data it appears (1) that the quantity of uric acid excreted may be above the average by about one fourth; (2) that in most cases it is not much below the average (8·6 grains); (3) that a low per-centage of uric acid may concur with a large amount of urea, but a high one with a comparatively moderate. Further investigation is requisite, but it does not appear at present that any close approximation to a direct or inverse ratio can be traced between the two constituents.

There is a decided tendency in the urine passed by patients suffering under azoturia to deposit oxalate of lime, and, in some instances, the crystals are very large and numerous. Lithates (as a sediment) are often present with the oxalate, or may replace it, and the view taken by Prout and Bence Jones that the two deposits are of the same general nature seems to me well founded. I have at this present time a patient in St. Mary's convalescent from rheumatic fever whose urine deposits remarkably fine specimens of uric acid crystals, together with oxalates both octohedral and dumb-bell.

The circumstance does not appear to me to have been sufficiently noticed, that such urine as these nerve-disordered, quasi-hysterical patients pass is altogether unsuited and discordant with their general condition. Pale aqueous low sp. gr. urine would be much more normal for them in their enfeebled hyperæsthetic condition than that which they actually secrete. We do not regard the urine passed by a patient in low fever as affording ground for a good prognosis because it is of high colour, contains an excess of urea, and in many cases appears quite like that of health. We know that when the period of full convalescence has arrived the secretion will, in all probability, be much paler, of much lower sp. gr., and altogether more like that passed by persons in a state of chronic debility. The earlier condition might be very proper for a man in robust health, living hard, and eating and drinking hard, but it has a very different significance in the prostrate fever patient, incapable of mental or bodily exertion, and kept alive on slops. In him it means excessive pernicious waste, the result of paralysis of the regulating nerves. In the former it means no more waste than is conformable to the activity of the organs, and the ingesta supplied to them. The two situations are gravely different. Now, between the patient suffering from azoturia and the fever patient there are notable points of resemblance. Both are enfeebled to a very considerable extent in their nervous and muscular systems, and both pass an excessive amount of urea, and probably of some other urinary constituents, regard being had to their exercise and their ingesta. In both, I believe, as health returns, the amount of urinary excretion falls materially. In both also the aim of judicious treatment is to maintain and restore failing vital power, not to correct disordered secretions. The hyperæsthetic, shaky azoturic patient must not be dealt with like a vigorous country squire attacked with plethoric gout.

A question which can hardly fail to suggest itself is how far the nervous derangement is the *result* of dyspepsia, and therefore not primary and causative, but secondary to the stomach irritation. My own experience inclines me decidedly to think that the nerve disorder is in most cases primary. For cases of gastric catarrh are common enough which present no such condition of urine as exists in the azoturic, and the latter, again, are not uncommonly exempt from any marked dyspepsia. That the functions of the stomach are often impaired in azoturia I do not doubt, but this seems to me referable to the condition of the general nervous system, and not likely to be removed by treatment addressed solely to the stomach.

The pathological view which seems to me to accord best with the facts is, that from some cause or other of an exhausting nature venereal excess, mental anxiety, malaria, gout, or the like, the nervous system generally, and especially the renal plexuses, fall into a state of partial paralysis. This is aggravated again by the excessive waste going on, and so the morbid condition is perpetuated until the original debility is put an end to by restorative means, or the waste arrested by opium. In some cases one kind of remedy seems more appropriate, in some the other. The 2 cases related by Dr. Prout show strikingly the good effects of opium. Similar instances, I believe, are not rare. A gentleman under my care, who passed when I examined his urine 1062 grains of urea *per diem*, was very little benefited by various tonics I gave him, but after taking Opii gr. j *ter die* for about a month, and travelling about for recreation for 3 more, he wrote to me to say that he had gained 9 or 10 lbs. in weight, was well and hearty, and had nothing to complain of. I regret that I failed to ascertain his weight when I analysed his urine, but I think it could not have exceeded, if it equalled, 12 stone. The amount, therefore, of urea to each lb. of body weight must have been about 6·3 grains. On the other hand, many cases are much benefited by nervine tonics. Dr. Sieveking related once to me the case of a clergyman in a state of general hyperæsthesia and loss of tone, passing 30 to 40 oz. of urine daily, which contained so much urea as to solidify with nitric acid. Quinine given to the amount of 30 grains a day reduced the sp. gr. from 1030 to 1010, and greatly improved his state and his sensation. The following case is somewhat similar. A clergyman, of mid-age, held a very good appointment in a situation which I should judge to be malarious. His health while there became so much impaired that he gave up the cure to take one of much less value in a more salubrious locality. His nervous system was so much deranged before he left that he used to feel a tendency to commit suicide. When I saw him he had been ailing some years with various symptoms indicative of failing nerve power, especially occasional ptosis of the left eye, and numbness of the left temple. He was always worse on Mondays. No dyspepsia. Slept badly. The urine crystallised spontaneously with nitric acid, about half its bulk becoming a mass of crystals. His family was large, and he had much mental anxiety. With Strychnia gr. $\frac{1}{20}$ *ter die*, and Extr. Hyoscy. gr. v—x *o. n.* he benefited greatly. When I saw him again after more than 3 years he continued to maintain his ground very fairly, and mentioned that the numbness he experienced in the left side of the face and a humming in the ears had been lessened very much by a holiday in the country. Dr. Fuller has found in one or two instances characterised by extreme irritability the bromide of potassium in conjunction with iron the best remedy.

The treatment may be summarised as follows:—remove causes of irritation and depression, if possible, and employ opium, tonics, nervines, change of air, and cold bathing, as the peculiar circumstances of each case may indicate.

Certain *hæmorrhages* and *blood-stained effusions* seem to me to have much claim to be classed among renal neuroses. The structural disposition of the blood-vessels of the kidney exposes it much more than other glands, or, indeed, most other parts to suffer in this way. A large round tuft of capillary loops, fed by a short straight arteriole given off at no great distance from large arteries, and having but a single venous outlet for its contents, is evidently more likely to have injurious strain put upon it than the solid plexuses of the liver, salivary glands, brain, or muscles. If the view I have proposed of the retentive quality of the capillary wall being impaired by loss of nervous influence be correct we can well understand how readily leakage may take place from these tufts special to the kidney, when relaxed arteries allow a more than usual amount of blood-pressure to act on the weakened capillaries. The two following cases under my own care were examples of actual hæmorrhage.

Case 10.—A—, æt. 45, male, had suffered for many years with symptoms of neurolysis and obscure remittent fever. Strychnia had been of great service to him. He was in all respects as well as usual; when late one night he was much alarmed by finding his urine very bloody, he came immediately to me, and passed in my room a little which was very full of blood, the red globules being diffused through the liquid, and not forming casts. No epithelium was present. After a dose of tannin + opium that night the next day's urine was smoky, but much less bloody, it deposited a brownish red sediment, consisting of red globules and numerous large octohedra of oxalate of lime. The supernatant fluid was red, clear, sp. gr. 1029, and notably albuminous. The same day at 1 p.m. at my house he passed urine which was pale and perfectly clear, and free from any deposit or albumen, sp. gr. 1013. The microscope detected nothing. The region of the bladder was quite soft and painless, he had no pain anywhere, except very slight uneasiness at the root of the penis. No relapse occurred, though he subsequently married and travelled about.

Case 11.—S—, æt. 60, female, seen September 4th. Ill more than 2 months, got a chill one evening in the country, and for 2 months afterwards was very depressed and feverish, but did not ail in any definite way. She was well fed and stimulated, and got better. The last fortnight she has been passing blood in her urine, it was at first claret-coloured, but now is very much loaded with dark blood. The sediment consists only of white and red globules, there are no morbid cell formations of any kind. Her health is generally very good. During her fever she was very thirsty, had no appetite, no diarrhœa occurred.

Tannin with Muriatic acid and Chloric Ether was prescribed; she took for 2 days ℥ss of the astringent per day. On the 6th the urine was much clearer, still a little coloured. The dose of tannin was reduced to gr. xv in the day. Three weeks later I heard that she was quite well, and had taken a long journey.

In both these patients the nerve-power was impaired—in the first by a chronic malady, in the second by a kind of low fever. Organic disease may pretty safely be excluded, as the hæmorrhage was of such short duration and was unattended by other symptoms. The most probable view is that the disorder was essentially similar to epistaxis, and dependent on an enfeebled state of nerves and vessels. Although the absence of blood-casts makes against the blood being poured out from the Malpighian tufts, yet I am disposed to think this was really the case, inasmuch as it seems more reasonable to look for the seat of such disorder in a highly vascular organ than in one much less so, the latter being supposed exempt from structural lesion. The presence of oxalates in the urine in the first of these cases reminds me of one related by Dr. Duckworth ('B. M. J.,' June 19th, 1869) where the same association of hæmaturia and oxaluria occurred. In this, however, the bleeding was attended with marked urethral uneasiness and with congestion of the hæmorrhoidal vessels, and dull hepatic pain, so that very probably his opinion is correct, that the blood was poured out either from the bladder or the urethra. I should rather think, however, that the irritation which acting on the kidneys produced the oxaluria, gave rise to the hæmaturia by affecting the excretory passages, than that the latter were directly irritated by the passage over their surface of urine charged with microscopic crystals of oxalate of lime.

Several cases have been recorded by Drs. Harley, Dickinson, Gull, H. Greenhow, and others, which I believe are in some measure allied to the preceding, but differ in these particulars—first, that the blood-corpuscles are not present, except very scantily, in the urine, but only their hæmatine in the form of granules or minute prismatic crystals, and, secondly, that the disorder is paroxysmal. Dr. Harley's first case had suffered repeated attacks of intermittent fever contracted in the tropics; his second was a Londoner, and had never had ague, but was very subject to feel cold and shiver, and it was positively ascertained by the thermometer that his temperature was abnormally low, only 96°·1 in the axilla. He was cured by the same treatment as the first, viz. by mercurials and quinine, after having previously had much medicine without any benefit. In the 3 cases cited by Dr. Harley from Rayer the hæmaturia was periodic, and was cured by quinine. Dr. Dickinson's first case had also had tertian ague, and when first attacked was at work in a district where ague was prevalent, but no drugs that have been administered have been of any avail. "The hæmorrhage has always ceased on the removal of the cold which produced it, and has recurred with undiminished readiness at the next exposure." In 2 cases contributed by Dr. G. Johnson the cause of the attack was always exposure to cold, and the same is true of Dr. Cock's case. Dr. Gull has recorded one case in which the original exciting cause was exposure to cold and wet, but the subsequent attacks seem to have recurred without any evident provocation (v. 'Guy's Hosp. Rep.,' 1866). Dr. H. Greenhow has related (v. 'Trans. of Clin. Soc.,' 1868) 4 cases of intermittent Hæmaturia, which correspond very closely with those above mentioned. He says, "the uniform character and course of the symptoms in the several cases clearly point to an identical cause, which I have no hesitation in regarding as some form of dyscrasia." He has noticed the occurrence of paroxysms somewhat similar to those of these patients in persons with gouty tendencies, and lays stress on the constant presence of oxalate-of-lime crystals in the urine passed during the attacks, and their absence as a rule at other times. A few blood-corpuscles were present in the urine in some of the paroxysms. In one instance where the temperature was examined it was found to rise during the attacks, but not above 100°. In several of the cases the disorder came on with rigors or shivering, more or less pain in the loins and limbs, general malaise, trembling, faintness, or nausea and retching. In Dr. Dickinson's first case the testes were closely retracted. In this and in both Dr. Harley's cases there was excessive elimination of urea during the attacks. In most if not all the cases the urine contained more or less albuminous matter during the time that it was of a dark red colour. The presence of tube-casts, made up of brown granules in the urinary sediment, shows that the blood (altered) comes from the kidneys and probably from the Malpighian tufts. The excretion of an excess of urea, as well as of oxalates, shows that the kidneys are over-stimulated, which may reasonably be referred to active hyperæmia of these glands, and the existence of this is strongly affirmed by the exudation of constituents of the blood into the urine. Having regard to the occurrence of the disorder in connection with ague, or with exposure of the surface to cold, to the co-existence of rigors, lumbar pain, and general malaise, and to the intermittent character of the disorder, it seems most reasonable to consider the nervous system as essentially concerned, and to regard vaso-motor paresis as the immediate antecedent of the hyperæmia. The causes of the paresis are probably various, some, as malaria and gout, may act on the nervous centres directly, others, as cold, may paralyse by the morbid impression they make on remote surfaces being transmitted to centres which are deficient in resisting power. In a like manner we may have dysentery produced either from malaria or cold and wet. It is remarkable how brief an exposure to cold may suffice to produce an attack of hæmaturia. Dr. G. Johnson relates the case of a policeman who became liable to attacks of hæmaturia after an injury to his back involving especially the left kidney. On one occasion an attack was brought on by putting his hands in cold water only for a minute. The effect of walking was also very marked; one attack was produced by his having walked 2 miles. This may be explained by the increase of pressure in the vessels which is induced by exertion, and which would of course be most felt by those of a weakened part. Dr. Bence Jones had a case of so-called chylous urine in St. George's, whose excretion while fasting was natural while he lay in bed, but walking about in the ward brought on a recurrence of leakage from the blood-vessels. In Dr. G. Johnson's case just alluded to the attacks commenced with pain in the left kidney, yawning and stretching of the limbs, and rigors, very nearly the same symptoms as occurred in Dr. Dickinson's and Dr. Gull's cases. The pain I interpret as a sensory paresis, and as affording further proof of the existence of vaso-motor paresis.

The breaking up of the blood-corpuscles is a noteworthy circumstance, but hardly alters the case materially from one of ordinary hæmaturia. Dr. Gull mentions an interesting instance where, after a fall on the back, a young lady passed dark bloody-looking urine, containing, however, no red corpuscles, but only their granular pigment. Yet one can hardly doubt that in similar instances blood-corpuscles might often be found in the urine. He also well describes (what I have myself noticed) the gradual recovery of the renal functions in scarlatinal dropsy—how the urine at first contains blood, then albumen and hæmatin, then uric-acid crystals or urates and some albumen, and lastly only normal pigment and other constituents. The kidneys when they regain their functions, he thinks, are able to break up the blood-corpuscles. On this view hæmatinuria betokens a less amount of disorder than hæmaturia. Dr. Dickinson is more inclined to conclude that the disintegration of the blood-corpuscles takes place within the vessels, which would be what actually occurs in pernicious ague with pigment formation in the liver or other organs. Frerichs mentions autopsies where the Malpighian tufts and tubes were found to contain more or less pigment. Under the circumstances existing in intermittent hæmaturia I am most inclined to adopt Dr. Dickinson's view. There can be no doubt that the blood in the vessels, especially its living cells, is positively under the influence of the nerve-force, and this may be one of the instances in which the derangement of that influence is sensibly felt. Dr. Beale regards the liver as probably more at fault than the kidneys, and suggests that the blood-corpuscles may be disintegrated by this gland, and afterwards eliminated by the kidney. He finds quinine of benefit.—('Practit.,' August, 1868.)

LEEDS SCHOOL OF MEDICINE

CHAPTER XLV.

UTERINE NEUROSES.

The uterus seems to come in for a fair share of neurotic disorder. This, indeed, might be expected, not only from its functional importance and its extensive sympathetic connections, but from the marked depression of nervous power with which its monthly evacuation seems to be almost constantly associated. The commonest form of dysmenorrhœa is recognised by Churchill and Tyler Smith as neuralgia. Besides these periodic affections there occur more continuous ones, which seem to be, however, of much the same character. The usual causes of neuralgia affect the uterus as they do other parts. Rheumatism, miasmata, and remote irritation play the same part here as they do elsewhere. The affection described under the name of "irritable uterus" appears to be a true hyperæsthesia quite distinct from neuralgia as we have seen it to be in the case of the stomach. Dr. Marion Sims' vaginismus appears to be essentially a similar hyperæsthesia of the vulva complicated in some cases with minute exquisitely sensitive tubercles. Common menorrhagia, not of organic origin, is evidently intimately connected with vaso-motor nerve paresis, and is restrained effectually by treatment corresponding to this view. Sir R. Martin mentions the frequency of uterine hæmorrhage in females who have been long in India, and refers it to weakening of the nervous and muscular power of the organ by long exposure to heat and malaria.

Two cases mentioned in 'Andral's Clinique Med.' ('Spillan's Translat.,' pp. 196, 199) illustrate the influence of paralytic states of the nervous system in causing uterine congestion and hæmorrhage. One was a female, æt. 70, who was struck with apoplexy, and at the same time her menses reappeared; after death her uterus was found filled with blood, and the tubes and ovaries considerably injected. The other was a female, æt. 75, who died with hemiplegia of the right side from a recent extravasation into the left hemisphere of the cerebellum. The cavity of the uterus was filled with blood, and the tissue of its body was intensely red. The shock to the nerve centres in these cases paralyses the vaso-motor nerves of the generative organs, and so generates hyperæmia. At the same time the death by coma may contribute to the result by causing venous engorgement. *Uterine Epistaxis,* as it is termed, is frequent after ovariotomy, according to Mr. Spencer Wells. It also occurs, as Gubler states, not rarely in the early period of febrile and inflammatory diseases. In both these cases we have conditions existing which may well paralyse vaso-motor nerves, viz., the shock of an operation, and the fever-miasm.

Case 1.—M. W—, æt. 25, female, admitted July 26th. Ill since her confinement nine weeks ago. Suffers with pains round the lower part of abdomen and dreadful bearing down. The pain causes her to bend double when it comes on; it is worse at night. Sometimes there are intervals of freedom from pain for about two hours. No discharge. Uterus appears quite normal. Appetite tolerable, but food lies heavy. Head giddy. Pulse not weak. Urine very high-coloured and copious. She took for three weeks pot. iod. gr. j + sod. carb. gr. xv + inf. gent. co. ℥j *ter die,* and used an opium and belladonna liniment. Under this treatment she improved very much, and was then ordered ammonia, soda, tr. hyoscy., and dec. cinchon., which she took until September 3rd, and was then discharged well. The state of the urine, the absence of marked prostration, and the efficient remedies point out the rheumatic character of this hysteralgia.

Inflammatory uterine rheumatism is, of course, a very different thing, and is well known to occur both in the pregnant and unimpregnated state. Some interesting instances of it in the latter have recently been recorded by Dr. Curran (v. 'Med. Press and Circular,' 1869, August 4) in which the disorder first attacked the uterus and its appendages, but soon after became more general, and developed into ordinary articular rheumatism.

Case 2.—E. N—, female, æt. 32, no children. Admitted October 28th. Ill six months. Suffers with bearing down pains, but has no discharge. The pains are aggravated at times, and she then passes a large quantity of aqueous urine. At the catamenial periods the pains are much worse. Uterus healthy. No pain in connection. No tenderness on either side of abdomen. A crural hernia on right. In the course of her attendance she had throat dysæsthesia for a time. She took citrate of iron and quinine + tr. nuc. vom. + spt. æth. chl. *ter die* for about two months, and improved steadily and satisfactorily. This case seems to have been one of simple uterine neuralgia. At p. 9 one is mentioned which depended on remote and latent irritation.

Case 3.—Dr. Day has recorded (v. 'Brit. Med. Journ.,' 1862, Jan. 4) a remarkable case of severe neuralgia of the uterus, which occurred in a lady, æt. 34, after a premature labour at 7th month. The pain came on about 9 days after delivery, and continued severe until the 13th or 14th day from its commencement, after which it gradually subsided. The abdomen was tympanitic and tender generally, the most painful spots being over the hypogastrium and left iliac region. The nates were painful and tender, the pain extending down the back and front of the thigh; there was also much pain in the lower back. The os uteri was slightly open, and pressure on it caused pain. The urine was at first copious and healthy, but as she got worse it became turbid. The pulse continued always 68, small, and weak. After the pain had lasted 11 days the tenderness was greater than ever over the hypogastrium, and the patient was completely helpless, being unable to move or turn herself in bed. There was severe headache, especially over the right eye. The back at the lower part was very painful, and the least pressure was agony. Fomentations gave no relief. The countenance was very pale and prostrate. Pulse 62. She was evidently getting worse. The port wine—she had previously had 4 ounces—was increased to 8 ounces, a belladonna plaster applied to the sacrum, and 2 grains of quinine given morning and evening. In 2 days the pain was everywhere diminished, she was better, and looked more animated and cheerful. From this time she improved, though a morphia blister (accidentally made too large) caused much vesical irritation. The recovery was aided by iron, quinine and iron, and a visit to the seaside. Dr. Day enumerates the circumstances which led him to persist in tonic treatment as follows:—An exhausting illness previous to the confinement, severe one-sided headache, large clean tongue, languid circulation. He judged correctly, "though for a few days the abdomen was so tender, and the pain seemed spreading upwards from the pelvis, that I was almost tempted to apply a few leeches, which would probably have aggravated the mischief." In such cases the use of the thermometer materially aids the diagnosis. The case reminds one a good deal of some of those related by Gooch, occurring at an earlier date after labour, where opiates proved so serviceable, and bloodletting so destructive, and where post-mortem examination disclosed a healthy state of the organs. A full opiate enema is a good remedy in all cases of abdominal pain and tenderness.

Case 4.—A. S—, female, æt. 18, admitted April 12th. Ill three weeks. Has violent pain at lower part of abdomen and bearing-down. Catamenial discharge has continued for last three weeks, is brought on by any exertion. Abdomen soft, bears pressure very fairly. She feels very weak. Bowels regular. She was ordered ammon. carb. gr. iv + liq. potass. arsenit. ♏iv + inf. gent. co. ℥j *ter die.* 19th.—Pain so severe two days ago that she fainted. Catamenia ceased. 22nd.—Is stronger; pain continues. May 6th.—Is a great deal better, the pain is felt only now and then. Pt. c̄ mist. Ol. Morrh. ʒj + vini ferri ʒss *bis die.* She did not return. In this case the affection of the sensory nerves was complicated with paresis of the vaso motor, and as both disorders were amended by the same remedy it may be inferred, as we have done previously, that they were "au fond" of the same nature. I have recorded a case (v. 'Lancet,' July 21st, 1855) in which paroxysms of severe neuralgia of the face issued in actual extravasation of blood in the eye and cheek. The pain would continue very severely for forty-eight hours, then begin to remit, and at the same time a blush would appear in the part, which increased until there was actual effusion of blood. The circumstance of the flow being brought on by any exertion betrays a very relaxed atonic state of the uterine arteries, which are unable to resist the slightly increased strain on their walls produced by exercise. It is much the same with the kidney in chyluria. Saexinger mentions (v. 'Schmidt,' vol. cxxii, p. 62) hard prolonged toil, exposure to a high temperature, much bodily exercise, and alcoholic excess, as causes giving rise to metrorrhagia. All these would cause nerve exhaustion.

Dr. Graily Hewitt ('Brit. Med. Journ.,' November 21, 1868) considers the irritable uterus to be really a retroflexed uterus, the irritability depending on the displacement, which obstructs the circulation in the body or fundus, and the whole organ being in a state of chronic inflammation. The existence of displacements backwards or forwards doubtless deserves attention, but I am rather inclined to think that there is the same difference between a chronically inflamed uterus and an hyperæsthetic uterus that there is between a case of chronic conjunctivitis and one of strumous ophthalmia. In the one the vascular congestion rules the treatment, in the other the nerve disorder.

Any one who has not read the pages penned by Dr. Ferguson in his prefatory essay to Gooch's 'Diseases of Women' (Sydenham Society's edition) on the subject of the irritable uterus has a treat in store. The points which an ample experience seems to establish are these—(1) The existence of such a disease as Gooch described, consisting essentially in pain, unaccompanied by any appreciable structural change; (2) that such a condition may be "independent of any vascular complication," of any hyperæmia, *i. e.*, may be a pure neurosis; (3) that it is apt to be extremely persistent; (4) that one of the seats of this neuralgic malady is the vagina itself, which is so exquisitely tender as to render intercourse intolerable; (5) that in another form the purely nervous aspect of the malady is masked by some obvious change in the uterus or its appendages, but this change is by no means a constant one, either in its seat, extent, or nature. Dr. Ferguson has known the same general train of symptoms coexist with every form of uterine ulceration, every degree of uterine infiltration, and without any. The local changes have been the fluctuating, the nervous affection the constant element, so that in the latter must consist the essence of this strange disease; (6) the disorder seems to be often of *toxic* origin, those who are most obnoxious to it having frequently an hereditary taint of gout or rheumatism, or else it is, like many other neuroses, an indication of an originally infirm nervous system; (7) the malady is not confined to the single, and when it attacks the wife and mother its social evils are greatly intensified. All natural feeling, and all sexual, are perverted or absorbed in a craving for commiseration, and the results to the family circle are, of course, disastrous; (8) in this malady the greatest amount of benefit is attained from general, and the greatest risk of mischief from local treatment.

In his excellent paper on 'Irritable Uterus' ('London Journal of Medicine,' May 1851) Dr. Mackenzie lays down that the disorder is rather of sympathetic than of idiopathic character, the immediate cause being reflected irritation, having its origin in various organs with which the uterus has intimate relations, but the predisposing being a defective state of the blood inducing hyperæsthesia of the nervous system generally, and of the uterine nerves in particular. Spinal irritation, gastro-intestinal disorder, gout, and rheumatism, he seems to consider as the principal causes of hysteralgia. From an analysis of thirty-seven recorded cases he shows that the principal complications are leucorrhœa and disorders of menstruation, the most frequent antecedents are dyspepsia, mental anxiety, and weakening discharges; the concomitant affections are anæmia, spinal irritation, and disorder of digestion. My own experience would lead me to take rather a different view as regards the influence of reflected irritation in causing hysteralgia. Causes of the former in the alimentary canal and elsewhere are abundantly common in my field of experience, but the special symptoms of the latter affection are extremely rare. Leucorrhœa, menorrhagia, dysmenorrhœa, are frequent enough, but it is very rare to meet with uterine hyperæsthesia, at least in a marked form. The affection seems to me strictly comparable to hyperæsthesia in other situations, and it is very difficult to say whether its essential seat is in the peripheral nerves or in the centres. Dr. Tyler Smith has mentioned to me a case in which frontal neuralgia and ague continued until puberty, and were then replaced by "irritable uterus." In this case the nerve disorder was not of reflex origin.

The *treatment* which seems rationally indicated in this disease consists of means which may calm the nervous system, and improve its power. The first should be used in a decided manner. Bromide of Potassium should be given till drowsiness is fairly produced, and some degree of this should be maintained. At the same time, or subsequently, suitable tonics may be administered, as Tr. Cinchonæ, Iron with quinine, Arsenic, Ol. Morrh. Subcutaneous injections of Opium or Atropine should be tried, and experience has pronounced favorably respecting vaginal suppositories containing morphia in gr. i to gr. iij doses. Dr. Churchill states that small blisters or dry cupping (to the sacral region ?) are of great service. The carbonic acid gas douche to the cervix has been praised, and is a means I should think worth trial. Dr. Hardy has found a stream of chloroform vapour directed on the cervix uteri to have a marked efficacy in soothing pain, both when it has been dependent on evident structural disease, and when none such has been apparent. The diet should be nutritious rather than stimulating, alcohol not being by any means excluded, but made to play a subordinate part in enabling the system to take and digest food better. An elevated locality and a bracing air (supposing them to agree with the patient) may be very important. The necessity for maintaining the recumbent position makes travelling, for the most part, impossible ; but in aggravated cases a sea voyage would be in more respects than one a valuable resource. It would separate the patient from unwisely sympathising friends, and, by making a complete change in her condition, might break the morbid habit of suffering.

M. Malgaigne describes a neuralgia of the cervix, which is probably allied to the condition we are considering, the essential characteristic of which is the presence of a painful point, generally a solitary one, and almost always seated anteriorly, and towards the left. In obstinate cases he has found incision of the painful point of the cervix to be attended with great success. The incision should be vertical, not horizontal, as the latter may cause more hæmorrhage than is desirable.

The treatment of Menorrhagia not depending on plethora, or organic disease, is generally very satisfactory. The patient is directed after the flow returning at the proper time has continued for three or four days to take tannin with acid. muriat. + liq. opii sed. + spt. æth. chlor. in doses proportioned in frequency to the amount of the hæmorrhage. When the flow is arrested by these means I give citrate of iron and quinine + liq. pot. arsenit. *ter die* during the intervals, and I usually find that their length becomes gradually increased, while the duration of the discharge diminishes. I am sure of the virtue of arsenic in such disorders, and I am rather surprised not to see it mentioned among the remedies advised in some works specially devoted to the diseases of women. There is nothing specific or peculiar in this action of arsenic, it is a powerful nerve tonic, and as such induces a better contraction of the uterine arteries. In his excellent paper on arsenic Dr. Begbie has specially noticed its action upon the uterus (v. 'Edin. Med. Journ.,' 1858, May). In some cases I have found strychnia + tr. ferri muriat. to answer well. In menorrhagia as in other instances a primary deficiency of tone or power produces results which react on and intensify the original defect.

Messrs. Griffins state (p. 135) that Menorrhagia and amenorrhœa are both less doubtful results of this irritable state of the cord; the former is exceedingly common, and is frequently seen alternating with sicknees or pain of stomach, headache and epistaxis. "We may mention that in a case of the kind in which there was no lumbar soreness and but little at the sacrum, and where every means that could possibly be suggested was employed for weeks with but partial relief, a cure was ultimately effected by blistering the sacrum. It was the most obstinate case of the kind we had ever met with in practice, and the blister was not resorted to until the most alarming debility with blanched lips and swelled feet had taken place." The result of this case justifies the opinion expressed by some recent writers of the action of counter-irritants by causing reflex stimulation of the nerves of internal organs, and so contraction of their arteries.

Respecting Digitalis and Ergot I need say nothing. Both act in a similar manner I conceive to the remedies above mentioned, and may sometimes succeed where they fail. Digitalis especially seems to be very useful in some severe and refractory cases.

That Amenorrhœa may sometimes be dependent on a contracted state of the uterine vessels seems likely from the fact mentioned by Dr. Parkes, that it has been cured by an attack of Influenza, a relaxant certainly of no mean power.

Pruritus of the vulva occurring during pregnancy is sometimes a cause of extreme distress, and as in a case mentioned by Dr. Churchill may render a very sweet-tempered woman so irritable and cross "that there was no living in the house with her." The vulva was perfectly natural, and no local application was of any benefit. The cervix uteri was, however, much congested and presented a superficial granular ulceration around the edge of the os. This was first lightly touched with Argenti Nitras, and then smeared over with a mixture of Opium and honey (ʒj ad ℥j). The effect was magical, two applications all but cured, whereas on a former occasion the disorder lasted until delivery. This is a brilliant example of the success of treatment when the cause of morbid phenomena is sagaciously searched out and dealt with in a rational manner. Gastric pruritus is a similar reflex hyperæsthesia, and perhaps might be dealt with sometimes in the same way.

In cases, however, where the disorder is not of reflex origin the application of a tolerably strong lotion of Cavendish tobacco (gr. 40—60 ad Oj Aquæ) to which borax is added is not unfrequently very serviceable.

OVARIAN NEURALGIA.

The terms ovarian irritation (Churchill), ovarian pain (West), ovarian neuralgia (Waring-Curran), are applied to a non-inflammatory affection, which may exist with or without derangements of menstruation, with general hyperæsthesia, and with congestion and erosion of the cervix uteri. Pain dull and constant, or acute and paroxysmal, greatly aggravated by standing, and generally by walking with local tenderness, but little or no tumefaction, and with occasional vesical irritability are the symptoms assigned to it by Dr. Churchill. In a case related by Dr. Curran ('Med. Press and Circular,' 1868, August 19th) the patient, æt. 27, had a severe and constant pain in the left iliac fossa, dull and aching, occasionally passing along the anterior surface and inner side of the thigh, and associated with tenderness and fulness in the left iliac region. She had been without sleep for a week, was not hysterical, her secretions were normal. The treatment which he has found most efficacious is Muriate of Ammonia gr. xv + Tr. Aconite ♏v (B. P.?) + Aq. ℥j *t. d.* Dr. Churchill has succeeded best with vaginal suppositories of Opii gr. ij + Ceræ Albæ ʒss + Adipis ʒiss introduced with the aid of the speculum, the patient remaining in bed the rest of the day. Dr. Prosser James has found aconite successful in cases of tonsillitis complicated with ovarian neuralgia.

I have seen a few cases in which the dysæsthesiæ were chiefly referred to the pelvic region, and, though I cannot affirm that the nerve disorder had its starting-point in the ovaries, there seems to be some affinity between them and those above noticed. In A—, æt. 49, there was a burning pain referred to the region of the pelvis, which was severe in lying and sitting, but relieved by standing; the pain had existed 6 weeks except during one catamenial period. The patient came of a gouty family. The pain was relieved by vaginal suppositories of Morphiæ Muriatis gr. $\frac{1}{2}$ + Extr. Bellad. gr. $\frac{1}{3}$, and a mixture containing Colchicum, Pot. Iod., and Pot. Bicarb. About a year later she consulted me on account of severe headache situated at the vertex, of a month's duration. The pelvic neuralgia had ceased about the same length of time. In B., æt. 38, there was excessive burning over the whole of the abdomen and thighs, with a sense of extreme weakness in the lower part of the body; she felt sometimes as if sitting on a heated seat. The sensation of heat was made much worse by aperient medicine, even Ol. Ricini, or by long walks. Catamenia regular; no leucorrhœa; no pain after food; no anæmia. With Strychnia + Ferri et Quin. Citras and a holiday she got "infinitely better." In C., æt. 25, there was pain at the lower part of the abdomen extending up to the epigastrium and even into the hands, causing her to feel very weak and short-breathed. After the pain had lasted some time it caused a sense of faintness all over the abdomen, took all her strength away, and unfitted her for any exertion. She felt especial weariness after the bowels acted in the morning, and also after dinner. A peculiar pain like something moving up and down or transversely was felt in the left iliac region, especially when she carried a heavy weight or walked briskly, but there was no tenderness on pressure. The disorder had existed 10 months. No catamenial derangement. With Strychnia + Nitric acid + Chloric ether, and a liniment containing Chloroform, Opium, and Belladonna, she got quite well in less than 3 months. It seems to me very possible that these neuroses had their seat in the hypogastric plexus.

I would refer here to the very practical paper of Dr. Addison on disorders connected with uterine irritation for an excellent account of reflex neuroses having their starting point in this viscus (v. 'Syd. Soc.' edit.). He appreciates fully the difficulty there may be in distinguishing abdominal neuralgia from peritonitis (v. p. 131, op. cit.).

CHAPTER XLVI.

SPERMATORRHŒA.

THIS is an unpleasant subject, but I do not see how we are to fulfil our duties as medical advisers if we ignore it. Man in his fallen degraded state, our fellow-man, we profess to aid, and we must at least give a considerate hearing to his troubles, however repugnant it may be to a pure mind to listen to some of the details. The term is rather a vague one, and includes several differing conditions, characterised by varying degrees of inflammatory congestion, hyperæsthesia, muscular irritability, and atonic relaxation. A due appreciation of these, as we shall see, is very important, though the symptom from which the name is taken exists in all. Some physicians regard all complaints of this kind as merely the conceptions and utterances of "malades imaginaires," and altogether reject any idea of local treatment, confining themselves to moral influence and tonic remedies. Some practitioners go to the other extreme, make too much of the local malady, and regard it too exclusively as the cause of the general perturbation. The most judicious thinkers, as it seems to me, take a "via media." Thus, Griesinger writes, "Lallemand's statements and opinions on these matters have met with much opposition, and in truth they present many weak points. But that which now concerns us, viz. the fact that many hypochondriacal and melancholic states are in connection with local disorders of the male genital organs, he has well succeeded in proving." In other cases "the disorder proceeds rather from the nervous system" (p. 198, Syd. Soc. ed.). Trousseau takes the same view, and expresses it at more length. "Experience proves," he says, "that in a great number of instances young people who have spermatorrhœa have had in their childhood nocturnal incontinence of urine, which itself is a somewhat grave nervous symptom, and very often there exist certain eccentricities of character, irritability and unmistakable signs of hypochondriasis at an age when such a malady is very rare. If the family history is disclosed it often comes out that among the ancestors, or the brothers and sisters, grave maladies of the nervous system have prevailed, as hypochondriasis, insanity, epilepsy, locomotor ataxy. We find, then, to account for the spermatorrhœa, as for the nocturnal incontinence of urine, hereditary causes, personal predispositions; and when this is the case we have no right to accuse the spermatorrhœa of having produced the symptoms; it is much more reasonable to think and say that the nocturnal incontinence of urine and the spermatorrhœa are the consequence of a morbid state of the encephalon, and especially of the cord, whose nature it is not easy to specify." He formulates his conclusion on the matter by saying that the defective state of the nervous system predisposes to spermatorrhœa, and the spermatorrhœa singularly aggravates the nervous disorder, the prime source of the evil.

The analogy of various diseases of the nervous system may be properly appealed to here. If vertigo, chorea, epilepsy, may result from some primary defect of the nerve-centres, or from remote irritation, may we not fairly conclude that the same holds good with regard to the hypochondriasis or melancholia of sufferers from spermatorrhœa? With some of them the nerve disorder is primary, just as it is in essential epilepsy, in others it is secondary, and results from irritation of the genital organs, produced in many instances by sexual excesses, or, perhaps, more often by masturbation. In the first class the deterioration of the nerve-centres is accelerated by the losses of fluid, in the second the weakening of the nerve-centre tends to perpetuate the irritation, or chronic inflammation, by the loss of tone which it induces in the vaso-motor nerves of the part. If, further, we have the proof of the pudding that treatment directed to remove this irritation is attended with the best effects in cases suited for it, I do not see what further evidence can be required of the correctness of this view. I am not sure that irritation is the best term to convey a correct idea of what probably occurs in such conditions as we are considering. What seems to be the case is this, that in a given place the nerve-filaments are altered in a certain way, the chief functional characters of which are hyperæsthesia and debility. This altered state is propagated along the nerves centrally to the cells of the cord, or other parts, induces a *corresponding* change in their contents, and so brings them into a *like* state. Inversely as the tenacity with which the higher centres persist in their normal nutrition will be the extent to which the morbid change will spread.

Those who are sceptical as to the effects of local irritation should read a well told case by Mr. Hilton (v. 'Lect. on Rest and Pain,' p. 268). I had a young nobleman once under my care whose hypochondriasis which had been traced to this source was cured in a short time by confining his hands at night. The effects of involuntary discharges and those produced by masturbation are essentially the same.

Those who believe, as Dr. Addison did, that uterine irritation may be a fertile source of cerebral and nerve disorder cannot consistently deny that an analogous disorder in the male may have a like effect; and those who admit the value of topical applications, not excluding the strongest caustics, to the cervix uteri cannot object to their use in the male, if discreetly managed.

The effects of spermatorrhœa on the nervous system are sometimes grave indeed. Taking only those cases which recovered evidently from arrest of this condition, as recorded by Lallemand or Lisle, we find extreme hypochondriasis, hallucinations, tendency to suicide, melancholia, maniacal delirium, lypemania. Failure of memory and of intelligence, sensory anæsthesia, rigid contraction of the limbs, incapacity for and loss of interest in ordinary avocations, lassitude, restlessness, disturbed sleep, dislike of the other sex, aversion to friends, and preference of solitude, are features which commonly are mentioned in detailed cases, and which often seem to have been dissipated by cauterization. The list might be considerably extended, indeed there seems scarcely any nerve disorder which is not capable of being produced by this cause. The various forms of mental aberration may either pass away with the spermatorrhœa, which has induced them, or may persist, although the latter has for a long time been cured. This is just what is observed in various neuroses. Occasionally, as Trousseau states, the special senses suffer. Double vision, and amaurosis more or less complete, noises in the ears and deafness, perversion of smell and taste, are mentioned as symptoms sometimes met with. Two lads under my care, æt. 14 and 15, were both almost completely deaf, and in both masturbation was admitted, but I did not learn to what extent it had been carried. In one certainly, and I believe in both, the external and middle ear was healthy. One had fallen and cut his head some weeks before the deafness came on, but there were no severe symptoms.

On the whole I am much inclined to attribute the deafness esentially to the vicious habit. In minor and more ordinary degrees of the disease pusillanimity and mental depression seem to be the striking phenomena.

If we compare, as I think we may not unreasonably, the so-called spermatorrhœa with other hyperæsthetic neuroses, for instance, with strumous ophthalmia, we shall be better prepared to undertake its treatment on rational grounds. We shall see that local treatment, which has the sanction of such men as Trousseau and Erichsen, is not to be excluded any more than it is to be exclusively employed. Cauterization of the urethra lightly and neatly performed in proper cases is as desirable as the instillation of nitrate of silver solution between the lids in phlyctenular ophthalmia, or sponging the larynx with the same in chronic laryngitis. Where, however, the condition is not one of chronic urethritis, causing reflex irritation, but of primary abnormal irritation of the vesiculæ seminales, cauterization is altogether out of place, and we must have recourse to sedatives, such as belladonna, digitalis, bromide of potassium, and warm or hot hip-baths, or hot sand-sachets. These latter applications may cause some temporary increase of disorder, but before long, Trousseau assures us, the sedative action of the heat declares itself, and improvement sets in. In the same class of cases the occasional introduction of a bougie of full size proves serviceable. In cases of a more passive character, with predominating atony and debility, cold baths, strychnia, and other tonics, are efficacious. Perseverance in properly directed treatment is most essential, especially where the disorder is of long standing. There is one rather queer remedy which Trousseau assures us has rendered him real services in a very notable number of cases, and which he did not despise, though he learnt the use of it from a quack. It consists of a sort of ivory or ebonite bulb fixed on a stem which is attached to a perinæal plate, at an anterior angle of 75°, and a posterior or coccygeal of 125°. The bulb is introduced into the rectum, and the sphincter ani grasping the stem keeps it *in situ*. How this apparatus acts it is hard to say, one can scarcely believe with Trousseau that it compresses the ejaculatory ducts. In cases where other means fail I should give it a trial.

CHAPTER XLVII.

CUTANEOUS NEUROSES.

As the principal sensory surface the skin may be expected to come in for its full share of nerve disorder, and this is to a great extent actually the case. I do not intend to refer here to neuralgic pain, which has been noticed elsewhere, nor to painful affections of traumatic origin, of which Romberg cites several interesting cases. The conditions I propose to illustrate are—(*a*) that of abnormal, (*b*) that of diminished sensibility, (*c*) that of vaso-motor nerve paresis, (*d*) that of vaso-motor spasm. One or more of these may coexist.

Cutaneous hyperæsthesia is far from being uncommon as a primary affection, it is often associated with more or less of papular eruption, but certainly may be quite independent. The following cases prove this:—

CASE 1.—J. A—, æt. 35, male, admitted September 29th. Ill six weeks, complains of continual itching all the whole day, affecting every part except the hands and feet; "can't bear himself when in bed." There is no eruption whatever. His health is good. Bowels open. Pulse weak. Feels weak. Has very frequent calls to urinate, but passes very little. He was treated with aconite lotion and carbonate of iron, and quite lost his itching in about three weeks.

CASE 2.—G—, æt. 47, complains of having suffered during three weeks great irritation of the skin, she felt as if she could tear her back to pieces at night. At that time, after scratching, she says, pimples come out attended with great sense of burning and scalding. There was no eruption whatever to be seen on the parts. With the aid of aconite lotion and acid. sulph. dil. ♏xxx *ter die*, she recovered from her troublesome disorder.

CASE 3.—W. S—, æt. 40, greengrocer, male, admitted February 15th, 1868. Ill 3 months; was up with his wife during her last illness for whole nights during 3 weeks, and has suffered ever since with excessive itching. The disorder is made worse by heat or by any exertion, is relieved by soft soap rubbed over the skin, and for one night by sulphur ointment, and by a warm bath after he has quitted it, though it is worse while he is in it. While he is out in the cool air he does not feel it. No indigestion, no trace of pediculi anywhere. General health good. He slept at first fairly well, but in 18 or 20 days the itching got so bad that he could not sleep at night; he had also got some catarrh and felt very poorly. On the chest, where he wore a warm covering, there was a slightly developed papular eruption, pale, with a few scratched spots. The hyperæsthesia affected only the trunk, not the limbs. Careful examination detected no other eruption, or scarce any, except that just noticed. During the first 5 days he had Pot. Bromid. gr. 20 *ter die*, for the next 14 Acid. Sulph. dil. ♏ 20 *ter die*. No benefit was afforded. I then ordered Hydr. Bichl. gr. $\frac{1}{16}$ + Aq. Dest. ℥j + Tr. Opii ♏ 4 *ter die*. He improved immediately, and got so much better that the itching troubled him very little. At his last visit, April 2nd, he was doing well.

I have long been familiar with the good effects of Bichloride of Mercury in lichen and prurigo, but have never before witnessed its efficacy in mere pruritus, for in this instance there was very little more. I have latterly made much use of Ungt. Staphysagriæ in prurigo senilis, as recommended by Mr. B. Squire, and have found it very efficacious, but I cannot help doubting whether it acts solely as a parasiticide. Certainly it has done much good in cases where the presence of pediculi seemed very doubtful.

In other cases there is some scanty and limited lichenous eruption, but it is evidently insufficient to account for the wide-spread and severe itching. I believe further that Romberg's view is correct, that even in marked cases of lichen and prurigo the hyper- or dysæsthesia is the cause and not the consequence of the eruption, and this for the following reasons:—(1) Decided inflammation of the skin produced by irritants, or as occurring in erysipelas, is not attended with anything like the severe itching of lichen or prurigo, yet in such cases the papillary structure must be involved. (2) The very marked influence of warmth and of the night in aggravating these eruptions is quite accordant with the genius of nerve disorder, and, on the contrary, unlike that of true inflammation. (3) One form—lichen tropicus—is produced by conditions eminently exciting and yet exhaustive of nervous power. (4) The relation of these eruptions to urticaria, which is evidently a neurosis. (5) The very small amount of inflammation in many severely itching eruptions. The causes of cutaneous hyperæsthesia are, apart from pediculi, very obscure; it is rare that we are able to influence the disorder by our knowledge of them. In the allied affection, urticaria, it is notorious that all sorts of things will give rise to the eruption in predisposed persons, each being especially sensitive to some particular substance. Here the predisposition is evidently the "grundleiden," and in hyperæsthesia it is much more so, as we are much less able to detect any exciting causes. The warmth of bed or of any source of heat is the chief excitor. This renders the disorder often a grievous infliction by destroying the patient's rest. In the case of lichen tropicus, the "prickly heat," the elevated temperature is no doubt the chief or sole cause, acting on nervous tissue, as it so commonly does, in the way of enfeebling power and increasing excitability. I have several times observed the reproduction of lichen urticatus in my own patients by summer heat. This influence of heat seems to me a very significant fact with regard to the essential nature of the disorder. Heat is an imponderable, and cannot act as a "materies morbi," nor is it likely to cause the retention in the system of "excernenda," but rather the reverse. It does, however, affect the nervous power very speedily and decidedly, and thus we can hardly avoid recognising the disorders which it produces as purely dynamic, and not dependent necessarily on any morbid state of the blood. This view is supported by the fact that in two toxic disorders, gout and syphilis, itching is by no means a marked or frequent symptom. I do not remember to have observed it in any of the cases of chronic gout I have had under my care; and in syphilis the less itching quality of the eruption is notorious. Jaundice is certainly sometimes attended with much itching, but much more often is not, at least in my own experience. I am therefore inclined to regard the affection we are considering as an essential neurosis, but as one which like many others may differ much in quality and causation in various instances. In some it may be of a more sthenic, in others of a more asthenic character. In some it may depend on direct, in others on remote irritation, in others, again, on toxæmia. In lichenous and pruriginous disorder, if at all severe, the administration of hyd. bichlorid. or some mild mercurial is requisite. In other cases saline aperients with a little vin. colch. may be sufficient. Soda baths and the sulphur fume bath are often very serviceable, the latter, however, should not be used in cases of a sthenic character, at least until after due depletion has been employed. In asthenic cases tannin may be of efficacy, or arsenic. Where the hyperæsthesia exists alone, or with but a little eruption, acid. sulph. dil. in ʒss doses *ter die*, or citric acid in gr. x—xv doses, with spt. æth. chlor., are beneficial. Bismuth ointment and aconite lotion are useful local applications. Stavesacre need not be confined to those cases alone where we suspect pediculi, but may be used in others. Henbane should be given in sufficiently large doses (gr. x—xv of the extract) to soothe the irritability of the system, and to procure sleep at night. Gouty neuralgia of the skin, from a description given by Graves (p. 585), seems occasionally to occur independent of any existing articular affection. Carlsbad water I should esteem its best medicinal remedy.

Urticaria by its fugitive character, by its manifold and various causation, by its nocturnal invasion, by the dysæsthesia attending it, and by the nature of its phenomena, fully asserts its title to be regarded as a neurosis. Its characteristic pale wheal-like elevations are the result of a cutaneous spasm, contracting the tissue into knots or "bumps." In persons with highly irritable skins pressure with a hard point on the surface will produce the same effect. Patients complain sometimes that the bumps are produced when they scratch themselves to relieve the previously existing irritation. The following extracts from Dr. Gull's paper on factitious urticaria ('Guy's Hosp. Rep.,' 1869, p. 316) are of much interest, and strongly confirm the above statements. After describing how some persons' names may be marked upon their skin by simply tracing the letters with a point, he proceeds:—"The effect is greatest where the skin is well supplied with muscular fibre-cells, and hence on the volar surface of the thumb it is scarcely produced. This susceptibility of skin is common in a greater or less degree to all persons, and can be termed morbid only when extreme. In the first patient in whom I noticed it it was the source of great inconvenience, for if the skin was handled roughly, as in wiping the face with a towel or in pulling on the socks, it would quickly become swollen and stiff with wheals. This susceptibility may be hereditary. It was so in the gentleman who afforded his arm for the sketch. His father's skin was equally irritable. In 4 other cases this tendency in the skin came on gradually, without any assignable cause. In one case only was there any recognisable disturbance of the general health, and that was in a youth of 15, who was liable to attacks of spasmodic asthma, which seemed to be associated with the state of the skin." Dr. Gull arrives at the conclusion that wheals are principally due to contraction of the muscular tissue of the skin. If a line be traced with slight force on a skin which is prone to this form of contraction the first noticeable change is a wrinkling of the surface as in "cutis anserina." In 40 seconds there is a slightly raised red line, in 60 seconds the line is palpably raised and hard, in 90 seconds there is an obvious wheal, which becomes fully developed in 3 minutes. If a large space be rubbed there is a sensation of tightness and stiffness as if the part were hide-bound. If 2 points be marked on the skin previous to the friction they are found nearer together after the wheal has risen. With the rising of the wheal, which is white and firm, there is an accompanying areola of capillary hyperæmia, which after 15 or 25 minutes disappears, leaving the wheal for a longer time persistent. After dropping chloroform on the skin, however susceptible it might have been before, no wheal could be brought out by friction, and when chloroform was applied to a wheal already risen it quickly reduced it. When ice was applied to a part immediately after friction a wheal did not rise. By stretching the skin the wheal could be obliterated, apparently by overcoming the resistance of the muscular tissue. Imperfect wheals, but essentially wheals, may be formed on the stomach or intestines of a cat or dog, as in the human skin, by passing a point sharply over their surface. These are plainly the result of muscular contraction.

It is, I think, probable that the dysæsthesia and the cutaneous contraction are co-results of the same nerve disorder, and that the latter is not merely a reflex of the former. The spasm is certainly not essentially dependent upon hyperæmia, as in urt. evanida it occurs without any. In some cases it may be produced in this way by the stimulus of an over-supply of blood. Dr. Broadbent has mentioned to me a case where urticaria is always produced by bathing, the skin becoming red with pale elevations. Here there is no toxic cause, no remote irritation, and no direct except the unusual blood flow of reaction. The diffuse inflammatory redness of the skin, which is so marked in some instances, and attended even with swelling, must be considered as an indication of vaso-motor nerve paresis, and we thus get in this curious malady three different pathological changes simultaneously resulting from the operation of the same cause, viz. spasm of contractile tissue in certain parts, paralysis in others, and a state of hyper- and dysæsthesia of sensory nerves. It is very instructive to note these various phenomena developed under our eyes, intimating to us what may occur on internal and concealed surfaces. Like most neuroses, urticaria may be produced by remote irritation, which is in many cases seated in the intestines, but may be elsewhere, as in the female sexual organs. Dr. West had a case in which leeches to the cervix produced severe rigors preceding urticaria. Scanzoni has recorded[1] some highly interesting cases where urticaria was produced by the application of leeches to the uterus. In one of these a woman, æt. 28, had five leeches applied to the cervix. Scarcely had they taken hold when she complained of most violent labour-like pains in the abdomen, and although these soon moderated in force, they were accompanied with such intense febrile action that the entire body glowed with heat, the pulse rose to 140, the carotids pulsated visibly, and the face, neck, and chest exhibited an intensely red colour, to which was added in a very short time a large eruption of urticaria elevations of a palish colour. The eruption was accompanied by great headache, inclination to vomit, and excessive lassitude, symptoms which continued to the following day, although the exanthem with the accompanying fever disappeared entirely after three hours' continuance. Scanzoni refers the phenomena to irritation of the uterine nerves, and states that they could not depend on the absorption of any poison from the leeches, as no such symptoms are ever occasioned by the application of leeches to other regions of the body. In a third case it is stated that the leeches had been applied eight times, and it was only on the ninth occasion that the urticarious phenomena occurred. It is clear how strongly the above history corroborates the theory of inhibitory action. Paralysis of vaso-motor nerves gave rise to the carotid pulsation, to the cutaneous hyperæmia, and through the vagi and the coronary plexuses, as well as the fevered blood, to increased action of the heart. The urticarious elevations show how a spasm may be produced together with a paralysis, as we have before observed. Imponderable miasms as that of ague may cause urticaria. The following is an example:

Case 4.—B. W—, æt. 33, seaman, admitted May 16th, 1867, had tertian fever some years ago, while in the Spanish Main. Liver and spleen not enlarged. Has been ailing about 7 days with stiffness in thighs, pain in back, giddiness. Two nights ago he perspired so that the drops ran off him, although the weather was very cold. Yesterday he felt rather queer in the evening, had pains in legs and thighs, could not walk without limping; went to bed at 8½; about 10 p.m. felt a stinging sensation, first in legs and afterwards all over, and the eruption came out with white wheals first, and such itching that he could hardly bear it; he became light-headed; in the morning the whole skin turned red. I found some traces of elevations with surrounding erythema on the abdomen the following afternoon, and when admitted earlier in the day he was red all over with raised *red* elevations. Tongue coated. Urine lateritious and red, not albuminous. Pulse 105, soft. Bowels open 6 or 7 times yesterday, once to-day. Head hottish, does not ache now, but did very much this morning. Appetite poor. Thirsty. He was ordered Quin. Disulph. gr. iij + Acid. Nitrici ♏ij + Aq. ℥j, *ter die.* Slight shivering occurred the same night, but he had no return of urticaria or fever during his stay in hospital. He had never had urticaria before, and denied having eaten shellfish or the like.

---

[1] v. 'Edin. Med. Journ.,' Oct. 1860.

The course of events in a case of this kind seems to (1) sensory nerve disorder, (2) contraction of *cutaneous* muscular fibres owing to irritation of their motor nerves, (3) paralysis of cutaneous vasomotor nerves and their arteries. It seems highly probable that both the urticaria and the sweating on the two previous nights were aguish manifestations. In the regular paroxysm we have first contraction of the cutaneous vessels and fibres, succeeded by relaxation of both, but in urticaria the vessels are paralysed while the fibre-cells are contracted. It is a very noteworthy circumstance that tissues so closely adjacent and so very similar as the fibre-cells of arteries and skin should be so differently affected. The relation of spasmodic contraction to paralysis appears in the latter at last becoming general and replacing the former.

In some persons who have otherwise good health urticaria persists in a chronic recurring form for years, just as many other neuroses do. A friend had it severely for several nights after eating prawns once; it quite destroyed his sleep, but in the day he seemed well. In all persistent cases the diet should be scrutinised, as very unsuspected articles may be the cause in those who are predisposed. The diathetic relations of urticaria are well shown in a case which is related in the 'Bull. de l'Ac. Impér. de Méd.,' Nov. 30th, 1866. A patient had attacks every night for 6 weeks; his parents were asthmatic, his grandfather asthmatic, his grandmother had angina pectoris and rheumatism, the brothers were rheumatic, and 4 of the children suffered from intermittent diarrhœa, alternating apparently with a tendency to, or actual development of, urticaria.

Rational treatment consists in the removal of any ascertainable cause of irritation, and in the administration of such means as may seem appropriate to calm the nervous disorder existing in the particular instance. In "urticaria ab ingestis" an emetic should be given, and followed, if necessary, by an aperient with or without a dose of calomel. In the more acute febrile conditions salines with hydrocyanic acid may be employed and subsequently mineral acids. Cazenave recommends alkaline baths. During the presence of acute disorder lead lotion may be freely applied to allay the itching. Henbane and camphor taken at night in full doses will be often serviceable in procuring sleep. In chronic cases without evident cause cold douching in the morning, and carbonate of iron *ter die*, or arsenic, or some nervine tonic, should be steadily administered. When the disorder is produced by malaria it yields to quinine. A medical friend told me he got rid of a troublesome urticaria by taking morphia. Another mentioned to me that a lady who was subject to urticaria could dispel it in 2 or 3 minutes by Brandy and water.

Anæsthesia of the skin not dependent on organic disease of nervous structure is by no means rare in connection with neuralgia and diphtheria, but I am little acquainted with it from my own experience in other morbid states. Tactile sensation which judges of temperature and locality must be distinguished, according to Jaksch, from common sensation, of which pain is a modification.[1] The faculty of touch may remain quite unimpaired while the consciousness of pain is lost. Carpenter states, however,[2] that the ordinary sense of tact may remain while yet there is no power to judge of temperature, and *vice versâ*. Romberg[3] says "that insensibility to pain with a continuance of the sense of touch occurs in various diseases, but most frequently in lead poisoning, and not rarely in hysteria, but never in cases where the sense of touch is destroyed." It seems difficult to reconcile the statements of Jaksch and Carpenter. For my own part I think it very doubtful that there are different fibres for the conveyance of the different sensations to the sensorium, as if this were the case the total number of cutaneous nerves would have to be extremely great. It seems quite possible that a nerve may be insusceptible of a particular impression just as the retina in certain persons is to particular colours. Romberg mentions the occurrence of cutaneous anæsthesia in washerwomen, and has no doubt that the immersion of the hands in the soapy water was the cause. The symptoms were much like those of neuralgia. Voison[1] describes hysterical anæsthesia as by no means a constant occurrence in all cases as Gendrin states it to be. On the contrary, it very rarely occurs except after severe convulsive attacks attended with unconsciousness. Briquet, however, controverts this, and states that of 221 anæsthetic females only 160 had had convulsive attacks. It is often of short duration, lasting only some minutes or hours after the paroxysm, but in inveterate cases it may persist for years. Voisin believes the anæsthesia to be dependent on the unconsciousness. The left side, as a rule, is the one which is anæsthetic, but sometimes the disorder affects the outer side of all the limbs, or even extends over the whole surface. While the skin is anæsthetic the muscles are usually in the opposite state.

---

[1] Schmidt's 'Jahrb.,' vol. cxx, p. 43.

[2] 'Physiology,' p. 255, 2nd edit.

[3] Syd. Soc. Translat., vol. i, p. 200.

Beau and Voisin agree that *analgesia* (loss of the feeling of pain) is always the first phenomenon in hysterical anæsthesia, that it always precedes the loss of the sense of touch. The analgesia is at first incomplete and gradually increases. It is rarely limited to small spots, usually it occupies a whole side, and that the left. When the analgesia is complete faradization with the wire-brush reddens the skin, but causes no pain. The mucous membranes of the nose, the mouth, and the vagina are sometimes affected, and usually on the left side. Loss of the sense of touch Voisin regards as a higher grade of anæsthesia; it is mostly left-sided, and in rare instances extends over the whole surface. Nearly the same may be said of the loss of the faculty of distinguishing temperature.

Diminution or loss of the sense of resistance depends on a deficiency of the muscular sensibility, and of the cutaneous tactile faculty; it is, therefore, a complex morbid state, and of rare occurrence, inasmuch as the muscular sense is only impaired in the worst cases of hysteria. When this complex paralysis is complete patients have no perception of the size, form, weight, and temperature of bodies placed in their hands as long as their eyes are averted.

Jaksch (v. loc. cit.) has specially studied the subject of cutaneous anodynia. He observed it in six or eight among 120 to 130 patients at Prague. It coexisted with other nerve disorders, especially those belonging to the hysterical class. When extensive it may involve *all* the mucous surfaces continuous with the skin. Occasionally it happens that the tongue alone is affected, the cutaneous sensibility remaining abnormal. The conjunctivæ and the nasal mucous membrane may be insensible to the strongest stimulants as liq. ammoniæ and mustard oil, no lachrymation or sneezing being produced. Smell is usually lost in anodynia of the nose, and taste in that of the tongue. Sir Charles Bell relates a case of plethoric hysteria communicated by Mr. Crampton, of Dublin, in which the right eye, the lids, and the skin of the cheek and forehead about an inch around were quite anæsthetic. The sight of this eye also had been quite lost for four or five months, and had been dim for four years or more since a blow on the eye. Under depletory treatment she quite regained the sight of the eye. The anæsthesia ceased some time previously when pain and deafness recurred in the right ear, where they had existed before the anæsthesia. The anodynia may be general, or one-sided observing accurately the median line, or it may affect separate tracts of various size. It never corresponds to the distribution of a single cutaneous nerve. The subjacent muscles are often similarly affected, at other times not, or they may be anodynic (to the electric current) while the skin covering them is normal. It is very worthy of observation that the most severe neuralgia may coexist in the same part along with cutaneous anodynia. Four fifths of the patients were females, the disorder prevailed most from the 16th to the 30th year of life, in uneducated persons, and more among Jews than among other persuasions. A mental perturbation was the most frequent cause, and healthful mental stimuli were among the most efficient restorative means. Other useful remedies were such as are usually employed in other neuroses, zinc, musk, quinine, morphia, electricity, warm baths as those of Teplitz. Cold affusions and counter-irritation were most effectual in recent cases.

---

[1] 'Gaz. Hebdom.,' xlviii, 1858; Canst. 'Jahresb.,' 1860, vol. iii, p. 98.

Hysterical hyperæsthesia is so much more commonly observed with us than anæsthesia, the latter perhaps being overlooked, and the tendency in many patients of this kind to "embroider" is so great that I confess I have for a long time received the accounts I have read of the above condition *cum grano salis,* as it is not easy to be well assured that some of the symptoms might not be feigned. But with regard to anodynia there can be no doubt that it must be the result of a real alteration in the state of the nerves, and no pretence. No normal conjunctiva or Schneiderian membrane would stand the test of liq. ammoniæ or mustard without giving unmistakeable evidence of sensibility. The experiment is precise enough, and unless we question the veracity of the author we must admit the occurrence of this remarkable sensory paralysis; and if of this then I think of other forms of so-called hysterical disorder, as real nerve—and not merely nervous affections. There has hitherto been far too much confusion between the bodily and the mental derangement, and because in many cases the latter has been present it has been too much taken for granted that it existed in all, and that the bodily was mythical. We shall always have much need to be on our guard against deception in the case of our meeting with a genuine hysteric; but on the other hand we have evidence enough, I think, that causes of exhaustion of nerve power may generate all kinds of morbid phenomena from the greatest hyperæsthesia, muscular agitation, and convulsion to anæsthesia, analgesia, and paralysis. Let us only think what must be the depressing effects of constant monotonous toil, scanty pay, poor food, bad air, and failing strength, especially where there is no bright ray of future happiness in a better state to light the gloom, and where, in the absence of healthy recreation, gin and prostitution are the devil's substitutes, and then say if we can be surprised at any amount of physical nervous derangement. Dr. G. Bird, speaking of paraplegia the result of enervation occurring in sempstresses, says, "They are unable to procure proper food, and are often driven to intemperance to forget their miseries, or to prostitution to add to their wretched income." In awe and sadness we ask ourselves at times, "How can these things be?"

Cutaneous anæsthesia is in rare instances dependent on peripheral irritation, and may be regarded as inhibitory. Brown-Séquard cites a case from Roche of a man who, after an injury to the left lumbar region, involving, probably, fracture of the first lumbar vertebra, became anæsthetic, and to some extent paralytic in the whole left side of his body. The loss of sensory and motor power proved to be dependent on the cicatrization of the wound, and were ultimately removed after having continued off and on for 15 years by 4 blisters in the vicinity of the cicatrix (v. 'Physiol. of Central Nervous Syst.,' p. 131).

There are a good many instances, some I have alluded to already, of *Paresis affecting the vaso-motor nerves of the skin and its glands.* The profuse sweating which affects persons whose nervous power is low depends evidently on this condition. A friend who had hemiplegia, too probably of organic origin, told me that when he had a lamp-bath he perspired very much more on the palsied side than on the other. Sir R. Martin has related to me the case of a lady who had suffered from frontal neuralgia and malarious fever, in whom there appeared now and then a largish patch of redness on the forearm near the wrist, from which such an abundant perspiration flowed that several handkerchiefs were saturated in about half an hour. If arsenic be allowed to be a nerve-tonic, which can hardly be denied, its remarkable efficacy in asthenic eczema, impetigo, and pemphigus, must be considered tolerably good proof that one chief constituent of these eruptions is a state of vaso-motor nerve paresis. Not only is the discharge arrested, but the abnormal temperature and vascularity are reduced. This is surely very like what occurs on galvanizing a divided sympathetic. Occasionally subcutaneous effusion occurs in place of surface discharge, and yields to the same toning treatment. I have recorded the case of a child, æt. 14 months, who suffered with diffuse erythematous redness appearing in various parts, on which at first a few bullæ were developed. A few days later both hands were intensely œdematous, the swelling had been preceded by redness. Quinine + iron + arsenic cured, although there was much feverishness. Certain roseolæ, and erythemata, and cases of recurring erysipelas, seem to depend chiefly on want of tone in the cutaneous vaso-motor nerves. Pemphigus hæmorrhagicus, in which the bullæ contain bloody serum, of which I observed some years ago an instance in a thin, feeble-looking man, æt. 60, forms a transition to purpura. In the case alluded to the eruption quite ceased under the administration at first of bark and ammonia, and subsequently of arsenic.

Dr. Nyssens relates the case of a girl, æt. 13, who was suffering from purpura hæmorrhagica. At first he prescribed perchloride of iron; but in dressing the patient for 2 or 3 days he observed that the symptoms—bleeding from the gums and nose, &c.—were not relieved, and were aggravated on alternate days, and that the patient also presented rigors, like those of intermittent fever. He therefore gave quinine, in addition to the iron. The effect in relieving the symptoms was at once obvious; and under the continued use of iron and cinchona, with nutritious diet, the patient perfectly recovered. ('Gaz. des Hôpit.,' March, 1864). Dr. Laycock mentions having notes of a paroxysmal purpura in a girl, æt. 17, recurring every 7 days. Dr. Ogier Ward communicates 2 cases in which purpura came on after a fright. One was that of a girl, æt. 4, who had been extremely alarmed by being punished at school. The spots appeared on the 4th day after, and she died on the 7th, convulsed and comatose from effusion of blood into the ventricles. The other was that of a boy frightened by a horse that attacked him as he passed through a field. He bled immediately from the nose, and on undressing him at night he was found to be covered with purple spots and patches. Dr. Seymour relates, in one of his published lectures, the case of a woman far advanced in pregnancy, who experienced a dangerous attack of purpura immediately after a fright. These instances, taken in connection with the notoriously enfeebling influence of fear and of malaria, seem to leave no doubt that purpura may be essentially conditioned by impairment of nervous power. The capillaries in consequence lose their retentiveness, and blood escapes. Considering the remarkable influence of Bromide of Potassium on the nervous system, it is very interesting and instructive to find that it may give rise to purpura. Dr. Walshe has seen this eruption follow immediately the use of the drug in a previously well-nourished individual, who had never before suffered from any hæmorrhagic tendency, and in whom the purpura disappeared on leaving off the medicine ('British and Foreign Medico-Chirurgical Review,' October, 1865, p. 490). The disorder may, no doubt, be of toxic, and probably of inhibitory origin. I have met with it several times in the course of acute rheumatism, once preceding, mostly as a sequel. In most, if not all the cases, more or less severe delirium had existed, indicative of a feeble state of nervous system. The treatment which I have usually found successful consists in the administration of Citrate of Iron and Quinine, with excess of Citric acid, or preferably lemon juice. Sometimes cholagogue purgatives are also necessary.

M. Parrot[1] relates the case of a female, a hystero-epileptic, in whom bloody sweating occurred during many years on the knees, thighs, chest, lower eyelids, hands, and face. The tears were once also tinged with blood, and there was frequently some hæmatemesis. On one occasion, together with the hæmatemesis, there was severe epigastric pain, and the skin of this part was covered with a bloody dew. These hæmorrhages were never an isolated phenomenon, they always succeeded to a mental emotion, and complicated a nervous attack, attended with absolute loss of motor and sensory power. At one time neuralgic paroxysms were attended with sanguineous exudation at the painful parts. There was no deception, Parrot himself witnessed the phenomenon. There was never any reddening of the skin in the parts where the hæmorrhage occurred. The catamenia seem to have been pretty regular, and their appearance always relieved the cutaneous hæmorrhage. Parrot cites various other recorded cases of a similar character, and observes, in conclusion, that this cutaneous hæmorrhage may coexist with others of a similar character in persons of a delicate, irritable constitution, especially in females; that all these hæmorrhages not only are associated with general nervous perturbation, but are further frequently connected with localized phenomena of pain and spasm; that they closely resemble these phenomena with regard to their efficient causes, the parts which they affect, the suddenness of their invasion and cessation, and their harmlessness. These hæmorrhages, which he terms neuropathic, proceed, he believes, from the glands of the external and internal tegument. They consist of true blood, and not merely of red-stained serum.

---

[1] 'Gaz. Hebdom.,' 1859, 40—47.

Franque ('Wurzb. Med. Ztschr.,' 1863, IV, p. 73) records a case of hæmorrhagic sweat occurring in an hysterical female, æt. 45, whose catamenia were regular. The bleeding ensued 3 times after long-continued severe convulsions, produced by mental emotions. On the 4th occasion Franque himself was present. The patient suffered for 4 days previously the most violent pricking pains along the vertebral column, in the left ear, the forehead, and the left arm. After the convulsions had lasted an hour there broke out all over the body a copious sweat, which appeared red at the parts which had been the seat of pain, and derived its colour from actual blood containing red globules. The convulsions and the pains now gradually ceased. As the skin appeared unbroken, Franque presumes that the hæmorrhage took place from the sweat-glands. This case confirms Parrot's conclusions, and so do those of a similar kind cited at p. 60.

Though a case recorded by Dr. T. K. Chambers did not show any notable nerve disorder, yet this certainly seems to be the rule, and it is quite possible that there might be paresis of the vaso-motor, and not of the cerebro-spinal system.

Under the head of *spasm* of the vaso-motor nerves of the skin, I might allude to the common "dying," as it is called, of the hands; when under exposure to cold the fingers turn white and numb, so as to be often for the time almost useless. Sir B. Brodie, in his work on 'Local Nervous Affections,' p. 42, observes that in some of those who are subject to so-called hysterical disease of the joints the whole limb is affected with a remarkable alternation of heat and cold. Thus, in the morning the limb may be cold and of a *pale* or *purple* colour, as if there were scarcely any circulation of blood in it, while towards the afternoon it becomes warm, and in the evening is actually hot to the touch, with the vessels turgid and the skin shining. Graves mentions a remarkable case of somewhat the same kind, the patient being a young female. One leg and a foot at a time became very hot, swollen, smooth, shining, and as dark in colour as a ripe black cherry. When the hot fit ceased, the slight swelling and the discoloration subsided, and the affected parts remained during the next stage pale, deadly cold, and comparatively free from pain. Only about three hours of complete intermission ensued in the twenty-four, one leg becoming affected as the other recovered. It is remarkable that perspiration does not seem to have occurred in consequence of the hyperæmia.

Mauthner relates the following case ('Schmidt's Jb.,' vol. 128, p. 179). A chlorotic girl had, at different times, redness and swelling, sometimes in the hands, sometimes in the feet, coming on with pain, and lasting always 3 hours, soon followed by a bluish-black discoloration, attended with coldness, anæsthesia, and paralysis. Sometimes collapse of the affected parts, and wrinkling of the skin, ensued. If this was the case the swelling always returned before the paroxysm concluded. Mauthner considers the cause of these remarkable phenomena to be a spasmodic contraction, first of the smallest, then of the largest veins, accompanied sometimes with contraction of the arteries. Since all four extremities were affected, the seat of the disease was probably central, in the spinal cord or medulla oblongata. The spasm, he thinks, was reflex, depending on irritation of the sensory cutaneous nerves. The paroxysms did not appear while the patient was recumbent, only in the erect posture. Quinine was of no avail, but under the use of iron the neurosis disappeared along with the chlorosis.

In these cases we have examples of alternating spasm and paresis of the cutaneous arteries, associated, at various times, with contraction of the veins.

The following are instances of nutritional lesions produced by nerve disorder.

Case 5.—A girl, æt. 17, without known cause felt violent pain in the hands; four fingers of the right and two of the left became slatecoloured, cold, insensible, in short exhibited all the symptoms of incipient gangrene. Movement was almost entirely abolished in these fingers. The induced current was applied, giving rise at first to increased pain, but soon arresting the sufferings of the patient. After ten to twelve sittings, at about the end of a week the sensibility, the normal temperature, and colour, as well as motion, were restored. The epidermis came off to the extent of the first appearance of the gangrene. During electrization a fœtid sweat was noticed over the electrified parts. (v. 'Brit. and For. Med.-Chir. Rev.,' April, 1859.)

Case 6.—W. P—, æt. 32, indoor servant, seen May 6th, 1856, admitted into hospital fourteen days ago. Has had no particular disease during his life; health good when his fingers became affected and for some time after. States that from two to three weeks before he was admitted his finger-tips were quite black and cold, but not numb; every one thought they were going to mortify. Before they turned black they used to be cold and numb. This state lasted about six weeks, the numbness then went away, and they became exceedingly tender and burning. During this second period, if he had his fingers in bed they were burning, if he left them out they got very cold. Between the two dysæsthesiæ he was prevented from sleeping. During the first period, when the fingers were cold and numb, they used to swell much at night. Some of the fingers now are perceptibly colder than the others, and of a semi-livid tint, and the cuticle yields under pressure with a sense of crackling, the pressure causing much pain though the part is numb. In other fingers that are recovering the cuticle is detached, and the skin is rather swollen and of a brightish red, and nearly normal warmth and sensibility. The left ring-finger has quite escaped and the right little finger. June 3rd.—Is exceedingly weak, pulse very weak, Right middle finger turns quite white when exposed to cold, while the other fingers of the same hand at the same time turn black and blue. All the fingers are now red and warm, the weather being so. Right index and mid-finger are very thinly covered with epidermis and are very tender. Left fingers are all quite well. Says his fingers have not gone on nearly so well since he left off the pot. iod. + quinine which he took for the first nineteen days, Since then he has had calomel + opium *bis die* for an attack of epidydimitis. By July 5th he was pretty well recovered, and left the hospital.

Mr. Myrtle records[1] the following case, which he terms one of anæmic sphacelus.

Case 7.—A military man, strongly built and of sanguine temperament, æt. 46, healthy looking, and having enjoyed uniform good health in spite of seven years' active service in the tropics and in the Crimea, complained of the following disorder. The fingers of both hands, especially those of the right, were pale and cold; the right little finger from its point to its middle felt cold as ice, and its ungual phalanx was blue—looked as if dead; under the tops of each nail, and extending across, there was a purple line about one tenth of an inch in breadth. The thumbs and the rest of both hands were natural. The last phalanx only of the right little finger was devoid of sensation. The ears were much colder than natural, had a mottled appearance, and exhibited on the outer and posterior part of each helix a number of ecchymosed patches. Heart's action normal but weak. Five days later he passed a sleepless night, having been kept awake by severe and constant burning pain in the feet and toes; the feet were pale, cold, and clammy, the extremities of the toes being bluish and tender to the touch; the fingers except the little one were well, and the ears nearly so. The extremity of the right little finger became gangrenous, and was removed by Mr. Walter Coulson, who was satisfied by careful examination that there was no disease in the arteries. Myrtle is of the same opinion, and refers the symptoms to feeble action of the heart, and lowered vitality from deficiency of nerve-force. Citrate of iron and quinine seems to have been most beneficial as a remedy.

---

[1] 'Lancet,' May 30th, 1863.

Remarks.—In these three instances the malady seems to me to have consisted essentially in disordered innervation. The coldness and numbness were, no doubt, the result of spasmodic contraction of the arteries, which produced in the two first cases the death and detachment of the cuticle from arrest of nutrition in the lowermost layer of cells, and in the second actual gangrene of a part of one finger. The lividity of the parts whose supply of blood was arrested depended on the stagnation of venous blood in the capillaries; this may be easily produced by application of ice to the surface, and removed again by warmth (v. p. 30). Why the cessation of *vis a tergo* should cause this remarkable venous congestion is not quite clear, especially as it is not an invariable result. The constringent influence of cold sometimes makes a part quite pale and white as it did the right middle finger in the second case, while the adjacent ones were livid. When this occurs we must suppose the capillaries and veins to have become emptied, perhaps by contracting like the arteries. I say perhaps, for I have seen whole tracts of capillaries in the frog's web appear *empty* and void of blood-corpuscles when their arteries were contracted, while they themselves were perfectly patent. It is probable that an alteration of the normal attraction and repulsion between the corpuscles and the tissues is concerned in the phenomenon. The exemption of one finger of each hand in the second case is a curious circumstance, and may be cited as a proof that the disorder could not depend on any external influence. The dependence of the disorder, in the third case, on some general "motor" must be admitted from the ears and the feet becoming affected in a like way. That "motor" may have been latent malarious infection in the one instance, but in the others there was no history of any exposure to such morbific agency. It is very remarkable that in the cases of Brachial neuralgia I have seen there has never been any modification of nutrition of the suffering parts. I know not how to account for this except by supposing that the vaso-motor nerves were unaffected. If this be the true explanation it is curious that the morbific cause should be so limited in its operation as to act on one set of nerves forming far the larger part of the nervous supply, and to leave others close by intact. The peripheral character of the disorder was very evident in all the instances. Embolism may, I think, be quite excluded as a cause. These cases are suggestive as to the possible occurrence of gangrene or wasting in internal parts from similar anæmiating arterial spasm. The treatment of such cases should consist, I think, in the administration of iron and quinine, ol. morrh., and belladonna in full doses, in the application of warmth and mild local stimulation, and the continuous electric current, though the induced proved beneficial in the first. This result was produced, I think, by the stimulus exhausting the undue excitability of the nerves. How limited vaso-motor spasm may be appears from the case of a female under my care, æt. 22, who on the 6th day of an attack of pneumonia stated that her feet were icy cold, though she perspired elsewhere.

It may admit of some question how far the alterations which ensued in the two preceding cases resulted directly from deficient nervous influence. It seems quite certain that mere loss of sensation in a part from division of its nerve causes of necessity no derangement of nutrition in it. The various branches of the fifth have been divided repeatedly without any such result, both in man for the relief of neuralgia and in experiments upon animals. The glosso-pharyngeal has also been divided and the gustatory without the nutrition of the tongue being notably affected. Romberg (vol. i, pp. 20, 22) cites two cases in which it is mentioned that the digital nerve on one side of a finger was divided, but nothing is said of any other result than the relief of pain. Büttner, after dividing the fifth nerve, protected the eye by a watch-glass and found that so long as it was thus kept from external irritation not the least alteration occurred. Jobert de Lamballe divided the sciatic nerve for the relief of severe neuralgia and spasm of the muscles, and about three weeks after the crural nerve on account of the persistence of pain in the thigh. The patient was delivered from his pain, but got an eschar on the sacrum and subsequent pyæmia of which he died. No ulceration seems to have occurred in the limb itself, and the sloughing of the sacrum, of course, could not be the result of the operation (v. 'Union Méd.,' No. 77, 1859). Malagodi seems to have performed the same operation with a successful issue. Mr. Paget gives two cases from his own experience proving that nutritive repair may take place perfectly in paralysed parts. Hutchinson has twice operated on the eye in cases in which the fifth nerve was totally paralysed, and in both the wound healed well ('Lond. Hosp. Rep.,' Vol. III, p. 324). On the other hand, there are cases which show that when nerves have been injured by disease or violence the circulation and nutrition of the parts supplied by them may be much impaired. Mr. Simon mentions ('Lect. on Pathology,' p. 74) the case of a man who some months previously had torn his ulnar nerve at the inner condyle; his two inner fingers had become swollen and livid with vascular injection. A female (v. loc. eund.) had disease of a large portion of the sciatic and lumbar plexus of nerves on one side, causing palsy and anæsthesia of the limb; neuralgia was referred especially to the vicinity of the knee, and at this spot ulceration had occurred. Sir B. Brodie records two cases of division of the ulnar nerve by accident in which three months, or some years after the occurrence, the little finger was numb, cold, of a purplish colour, and in one presented vesications followed by superficial sores which healed but recurred again. Mr. Paget cites cases from Messrs. Travers and De Morgan showing that the reparative process in the same person after injuries to the cord goes on well in the sound, but scarcely at all in the paralysed parts ('Lect. on Pathol.,' Vol. I, p. 43). Mr. Hutchinson and Mr. Syle have recorded cases of paralysis of the ulnar and median nerves from wounds in which the hands were livid, and from 4° to 6° F. colder than the corresponding healthy (v. Med. Times and Gaz.,' 1863, Feb. 14th, March 21st).

The notorious liability of palsied parts to be injuriously affected by degrees of cold or heat which a sound part could well endure, and the great tendency of the eye to suffer from destructive inflammation when the fifth nerve is divided, make it nearly certain that loss of nervous influence does in some way impair, though it does not abolish, the nutritive power of the tissues. The paralysed parts are more liable to disease than sound parts, but do not necessarily suffer. They are the more liable to do so in proportion as their vital energy, their nutritional capacity, is weaker. Further, it appears that irritation of nerves may be a more potent cause of disease than even paralysis. Mr. Hilton's case proves that irritating pressure on a nerve may determine ulceration in the parts supplied by it (v. Paget's 'Lect. on Path.,' Vol. I, p. 43). In a case recorded by Mr. Hooker (v. 'Lancet,' Oct. 1st, 1859), where the popliteal nerve was successfully divided on account of obstinate neuralgia of the leg, attended with ulceration, the ulcers healed soon after the operation.

It is very conceivable that where a nerve is injured by violence the cicatrix may keep up irritating pressure on the accompanying vaso-motor nerves, and so the blood-vessels of the parts supplied may be persistently contracted, and the nutrition of the tissue suffer in consequence. This will be all the more likely to happen if the vital power of the part is either originally weak, or is impaired by loss of its normal *vis nervosa*.

Some reference must be made here to the remarkable disorders observed by the American surgeons in cases of gunshot wounds which had injured but not severed the nerves of a limb. The principal phenomena were severe burning pain, perverted nutrition of the skin, the nails, the hair, and sweat glands, as well as of some of the articulations, besides in many instances more or less paralysis of motion and sensation, with or without contraction of muscles. The perverted nutrition of the skin showed itself by more or less wasting and thinning of the epidermis, and in the occurrence of eczema or ulceration. The epithet "glossy" well describes the aspect of the skin, which may be deep red, or mottled, or red and pale in patches. Glossy skin is generally attended with burning pain, and the part so affected is apt to be extremely hyperæsthetic. This distressing symptom was more relieved by repeated blistering than anything else. In a case of glossy skin recorded by Mr. Paget the hands were insensible or nearly so, but only occasionally in pain, and were very apt to become cold. It is most probable that the course of events is not identical in all cases of this kind. After nutritional lesions have ensued in remote parts, as the hand, more or less alteration may take place in the pathological condition, the sensory disorder may be modified, and the vaso-motor spasm replaced by paralysis. This may occur earlier in some cases than in others. In one of Mr. Paget's it occurred at the end of 5 weeks. Here there was at first almost complete motor and sensory paralysis; subsequently the numbness was replaced by pain, and the skin of the fingers became hot, and red, and glistening.

The circumstance that the phenomena occur in cases of *partial* injury to nerve-trunks, not where the latter are completely destroyed, that they usually arise while the wound is healing, and are in many instances distinctly related to the occurrence of inflammatory accidents in or about the wound, goes far, I think, to connect the symptoms causatively with the production of cicatricial tissue in the injured nerve-trunk, as above suggested. For further remarks on this subject I may refer to a paper "On Trophic Nerves" in 'St. George's Hospital Reports,' 1868.

SCHOOL OF MEDICINE

CHAPTER XLVIII.

MALARIAL DISORDER.

Perverted and distorted as the truth respecting malarious disease has been by certain writers, so that a sober-minded man feels almost necessarily fearful of being thought to sanction in any degree their extravagances, it yet remains unquestionably true that there is no group of morbid affections of more weighty and practical interest, and which more claim our attention, than those which belong to this class. I will refer briefly to some of the points which justify this statement. (1) The almost universal prevalence of these diseases in all parts of the world is a striking fact. One can scarce open a book of travels without lighting on some reference to the endemic fever. Most intense and wide-spread in the tropics, where the malarious influence sets its stamp on almost all morbid action, it prevails as far north as 62°. (2) The apparent absence of anything special or peculiar in the conditions which give rise to it. Moisture and warmth seem to be the efficient causes of this strange malignant influence. A soil, or even a rock needs but to have been wet and to undergo drying to become a source of disease. Even drying wood is adequate to produce the miasm. I am aware that evidence has been collected to show that ferruginous soils are eminently prone to generate malaria, but it cannot, I think, be contended that this fatal quality is peculiar to this kind, or to any. Rather it seems like the fulfilment of the original curse pronounced on the ground for man's sake. Excess of moisture and complete dryness arrest the development of malaria, indicating plainly that the formation of the poison is somehow connected with the act of drying. (3) The obscure (but undoubted) relation between malarious disease, heat-stroke, influenza, and cholera, and the much greater prevalence of these disorders in some years than in others. (4) The very various diseases which malaria commonly produces, as fever, neuralgia, and dysentery. These may stand as representatives of the chief kinds of morbid action, showing how multiform may be the phenomena which spring from this origin. (5) The especial predilection of malaria for the nervous system, and the vast, almost endless variety of disorders it is capable of generating through the intermedium of this system. This circumstance, and the consequent tendency of ague to be associated with peculiar, anomalous, and alarming symptoms, as in the so-called pernicious fevers, gives a deep interest to the study of malarious affections. (6) Though in our own land we see comparatively little of malarious disease in its more severe forms, yet owing to the wide extent of our colonial empire there are but few families who have not some member more or less exposed to suffer from them, and the number of those who return home invalided from such disease is large and increasing. It is quite clear, therefore, that a practitioner should be well acquainted with the manifold manifestations of malarious intoxication if he desire to meet the requirements of his day. It is by no means sufficient to know how to manage a tractable well-behaved ague, we should be prepared for a variety of strange, anomalous, and puzzling forms of disorder which will be sure to perplex us if we have no clue to guide us to comprehend them. This clue will be found (1) in a knowledge of the laws of neuropathology as developed by Bernard and others; (2) in an acquaintance with the action of malarious influence of nervous tissue. The former topic has been sufficiently noticed.

With regard to the second it may be remarked that the phenomena from which we have to judge do not all present the same character. The contracted vessels, and skin, and the rigors of the cold stage of ague appear to evidence a stimulation of vaso- and musculo-motor nerves; while the increased temperature, the full pulse, the flushed surface, and the dilated vessels of the hot stage all show the existence of a state of paralysis of nervous and muscular tissues. The diarrhœa, dysentery, splenic, hepatic, or thyroideal enlargement which are so frequently produced by malaria can only be interpreted as results of dilated and paralysed arteries, and consequent excessive flow of blood to an enfeebled tissue.

In some cases of lethargic fever to be presently referred to it seems most highly probable that the intracranial nervous centres are directly paralysed. The prolonged operation of malaria has, it is notorious, a remarkably enfeebling and depressing influence on nerve power. Dr. Copland writes, "The peculiar or specific action of marsh poison, as I well know from experience, occasions a distressing feeling of depression and despondency, even when it does not induce open disease." (Art. 'Remit. Fever,' p. 949.) All these facts go far to show that the action of malaria is mainly paralysing; and there is not much difficulty in understanding how some of its effects may appear to be the contrary. Spasm and paralysis are certainly very different phenomena, and so are delirium and coma, but it is not doubtful that both may occur in the same individual from the operation of the same cause. The typhus miasm causes delirium and coma, and sometimes renders the muscles half rigid, while generally they are utterly paretic. In chorea we have not seldom very considerable paresis from the same cause that gives rise to spasm. In urticaria we have spasm (in the pale wheals) side by side with paralysis (in the congested intervening skin). Dr. Little believes that both spasm and paralysis originate from the same kind of lesion, but that the latter depends on a greater amount of lesion than the former.

Premising these views the following *rationale* may be offered of the events occurring in a fit of malarious fever. For some while before subjective symptoms occur the depression of nerve power has commenced, as may be concluded from the rise which takes place in the temperature (Ringer). This paresis increases, and seems to affect especially the solar plexus, and the cardiac, and their offshoots. The solar plexus I incline to think is the one most constantly and principally affected. Sir Thomas Watson notices as one of the earliest symptoms a sensation of debility and distress about the epigastrium, and Sir R. Martin, speaking of remittent fever, states that the depression caused by a violent blow on the abdomen more nearly resembles the febrile collapse than any other morbid condition with which he is acquainted. The cardiac ganglia may very well be secondarily affected by inhibitory influence proceeding from those of the solar plexus. A gentleman who suffered from gastralgia had, as his medical attendant informed me, a mere flutter of a pulse during the attacks. While the cardiac nerves are thus directly or indirectly rendered paretic, the vaso motor, especially of the abdominal arteries, are in the same state, and the viscera are consequently congested. In the limbs, however, perhaps in all parts supplied chiefly with cerebro-spinal nerves, which are more highly organized, spasmodic disorder for some time predominates over paralytic. The muscles are agitated by clonic spasm, and the arteries constricted by tonic, while the muscular fibres of the skin are contracted as when they are stimulated by electricity.

When the hot stage commences the cardiac nervous centres recover, and the organ resumes its activity. The arteries, however, remain dilated, and so a full tide of blood is poured through them into the capillaries, swelling up the previously shrunken superficial parts and by the increased supply to the muscular tissue of the heart exciting it still further. If the carotids and vertebrals are much relaxed dangerous intracranial hyperæmia may occur, and the congestion of the abdominal viscera, which existed before, is now still further augmented. During the latter part of the hot stage, and the whole of the sweating, the temperature falls, and the urea excretion, and that of chloride of sodium, vary correspondingly. The phosphoric acid, on the contrary, is diminished to one eighth of its normal amount during the whole three stages, and does not rise until after the fit is terminated, though even then it is far below the normal (Nicholson, 'Madras Quart. Journ. of Med. Sc.')

The sweating stage is evidently the period of recovery, the urine is increased as well as the cutaneous excretion, the pains and other morbid sensations depart, the thirst ceases, and the pulse becomes normal. The sweating, as Sir T. Watson observes, may be attributed to the more forcible propulsion of the blood, and I would add to the relaxation of the superficial vessels, both of which events are produced by exercise (causing sweat). The first sign, however, of recovery appears to be the heart regaining its power, which coincides with the commencement of the hot stage; its excessive action, which constitutes *Ardent* fever, being less dangerous than its almost complete failure which characterises *Syncopal.* The hot and cold stages are really but one, either may be awanting; in both the essential fever signs exist, viz. nerve prostration and high temperature, and the only difference is that in the cold there is a blending of spasm with paralysis, in consequence of which "the outer parts freeze, while the inner burn." The cardiac depression, which is also very characteristic of the cold stage, may reasonably be attributed in part to morbid stimulation of the vagi which are affected like the muscular nerves. And the same state causing constriction of the bronchi will explain the difficult breathing.

The following illustrations may be of use to some who are not familiar with these disorders, and may remind us that even in

Europe we may have to deal with very formidable results of malaria.

CASE 1.—Graves relates being sent for to see a gentleman who had slept well till about 4 a.m., when he was awakened by a general feeling of malaise, shortly after which he complained of chilliness, some nausea, and headache. After these symptoms had continued about an hour his skin became extremely hot, the pain in the head intense, and drowsiness was complained of, which soon ended in perfect coma with deep snoring and insensibility, in fact he appeared to be labouring under a violent apopletic fit. He seemed to derive much advantage from bleeding and other remedies, and to my surprise was perfectly well when I visited him in the evening. The day but one after, at the same hour, the very same symptoms returned, and were removed (?) by the same remedies. I confess I could not explain in a satisfactory manner the perfect freedom from all cerebral and paralytic symptoms after two such violent attacks of apoplexy; but when a third attack came on I then saw that it was a case of the *tertiana soporosa* of nosologists, and I prevented the return of the fits by the immediate exhibition of large doses of quinine (p. 225).

CASE 2.—Andral ('Clinique Med.,' p. 86) records a very similar instance. A woman, æt. 63, who generally had good health, was attacked one morning with great illness, vomiting, and violent pain of the head. After the lapse of 15 minutes she uttered a loud scream and fell, deprived of consciousness. Half an hour later Andral found her plunged in profound coma, pupils large and motionless, scarce any reflex contraction of orbic. palpebr., face injected, not distorted, all the limbs in a state of complete relaxation, and insensible. The pulse was strong and not frequent, the heart beating strongly. In spite of V. S. the coma continued till 6 p.m., when all the symptoms disappeared. A second similar paroxysm occurred the second day, and lasted till the middle of the third. A third paroxysm continued for 35 hours. Quinine was then administered very freely. The next paroxysm was retarded in its arrival, and was much less severe. The patient had violent headache, without vomiting, shivering (which had been absent previously), some convulsive movements of the face, coma for only 2 hours, after which she remained for some time as it were benumbed. The treatment was continued, and no further disorder occurred.

In both these cases the nervous system was under the influence of a poison, which was counteracted by quinine. The encephalon was hyperæmic, no doubt from relaxation of the coats of its arteries, but this hyperæmia was not at all the cause of the cerebral symptoms. Had it been it is certain that they would neither have come nor departed so speedily and completely. The same cause which paralysed the vaso-motor nerves and dilated the arteries paralysed also the cerebral nerve-centres. A better instance of truly functional paralysis can hardly be imagined. It is very instructive to find rigors declaring themselves, as the force of the morbid influence was diminished by the remedial. This confirms Dr. Little's opinion. The *delirious* form of pernicious fever, Trousseau says, is characterised by a delirium which, often announced by hallucinations, sets in at the commencement of the rigor, augments in intensity during the hot stage, and ceases with the cessation of the sweating. In the *convulsive* form the convulsions are usually at the same time tonic and clonic, epileptiform, but they may be also though more rarely exclusively tonic, tetanoid. The *syncopal* form of pernicious fever has been already noticed (v. p. 594), but I may add that in the variety termed *cardialgic* the pain which the patients experience at the epigastrium is so violent that they utter terrible shrieks. Patients laid out for dead, as Trousseau states, have been restored by the administration of quina, which would be best given by the subcutaneous method. The *peripneumonic* form is characterised by difficult breathing, turgid face, injected eyes, sweating of the forehead and chest, copious mucous bloody expectoration with fine crepitating râle all throughout the lungs. In some cases the pleura is more especially affected, there is sharp pain in the side, and on physical examination effusion is found to exist, which generally becomes resorbed during the free interval.—(Trousseau.)

Morton relates (p. 208) how "Domin. Atwood habitans sub Insigni Lunæ dimidiatæ in vico dicto Cheapside, vir sexagenarius, postquam ad tres vel quatuor dies statis periodis jam febricitaret, jam melius se haberet, tandem quasi in instanti diris ventriculi ac Intestinorum Spasmis, Vomitionibus et Dejectionibus immanibus choleram morbum referentibus correptus, et penè confectus in hoc mortis procinctu stans," sought his aid, and was speedily cured by the aid of bark and laudanum. One of Torti's cases is that of a man who at first had a simple tertian, on 5th day complained of pain in the stomach, but was relieved when the paroxysm declined. On the 6th day, which should have been free from fever, the disorder came on again, "cum alvi fluxu et intensiori ventriculi morsu," but again the symptoms subsided as the paroxysm closed. On the 7th day the fever came on with such violence that most severe pain was produced in the stomach and intestines, blood was rejected upwards and downwards, he was bathed in a cold clammy sweat, his voice was squeaking (clangose), and his pulse was almost extinct. Bark was given, and after a time retained; less blood was passed per anum, and the pulse rallied a little. During the night the other symptoms improved a little, "licet ferme cadaver esset æger." By persevering with bark he got well.[1] In the above forms there is special affection of some particular organ, but in the algide and sudoral this is not the case, and the characteristic feature of the fever results from the exaggeration of some of its ordinary phenomena. In the *algide* fever, as Trousseau describes it, the cold stage lasts the whole attack. It commences at first by a rigor which is much more violent than usual, and rapidly increases in intensity; it lasts several hours, then the temperature of the body falls really and to a notable extent, the tongue itself becomes icy, and the skin if pinched up in a fold remains so, just as it does in epidemic cholera. There is intense thirst and extreme anxiety, the face has a cadaveric expression, the pulse does not rise, and if the symptoms cease vital warmth returns very slowly. In the *sudoral* fever the sweating stage comes on a little sooner than usual, and quickly becoming excessive it inundates the surface of the body. It is a cold sweat, and is associated with a rapid, small, weak pulse, a frequent and painful respiration. The fingers look as if they had been macerated, and the temperature falls so greatly that the patient has to be warmed artificially. Death may occur in the first attack, but if recovery take place the mental and bodily exhaustion is extreme. A rationale of the symptoms in the "febres comitatæ," as they were called, seems to be afforded by the conception of vaso-motor nerve paresis relaxing arteries and impairing the retentive power of capillary vessels in the parts affected. The violent pain which is felt in some of these implies a state of sensory nerves which we have repeatedly had occasion to consider as the equivalent of motor paresis. In the *algide* fevers the phenomena indicate the existence of spasm of arterial nerves in the more superficial parts, though in the viscera the opposite state probably prevails, the outer parts freezing while the inner burn. The action of the heart at the same time is depressed, being kept probably by its sympathetic nerves in a state more or less analogous to that of the vessels, in fact being semi-tetanized. The *sudoral* fever seems to be characterised on the contrary by vaso-motor paresis and profound nervous depression, concurring with a like state of the heart itself, probably from a paralytic state of its proper centres. The condition is similar to that which exists in syncope, fatal apoplexy, opium narcosis, and pulmonary embolism, in which extreme exhaustion of nerve-force conditionates profuse sweating.

---

[1] The abdominal neuralgia which we have at the present day is sometimes clearly the representative of these more formidable pathemata, which have been shorn of their intensity by an improved hygiene.

Malarial collapse, as it is termed by Mr. Power, is a perilous accident to which ague-sufferers are liable. "The main symptoms are sudden coma, with dilated pupils and coldness of body, in a person who has had an attack of ague severe or mild; he is, in fact, convalescing, but not so rapidly as he ought; he complains of literally nothing but weakness. Five such cases occurred in the 13th; the first was not treated with quinine and died, the other 4 recovered well, though almost pulseless, cold, and comatose when the quinine was administered. The post-mortem signs were a huge spleen, and a profound anæmia of all other parts of the body; veins and arteries empty of blood; no congestion anywhere; a small yellow clot on right side of heart. The absence of fever with the suddenness of the coma render it extremely dangerous. In 2 of my cases the orderlies supposed the men to be asleep" ('Med. Press and Circular,' May 12th, 1869).

I refer for other examples to M. Bailly's work on intermittent fevers, and to Torti's 'Thérap. Special.'

I now proceed to notice some of the obscurer forms in which malarious disease appears in this country, (1) in children, (2) in adults. I do not intend to advert to common ague, or its hemicranial equivalent, but to some maladies which are scarcely recognised in ordinary text-books, though they have not escaped the observation of Dr. Copland and Dr. Macculloch before him. As my field of experience has been a district of London it may justly be expected that I should adduce some proof of the possible production of malaria in this place.

Case 3.—A hard-worked medical man resident in Paddington for eleven years, informs me so far as he knows he has never been in districts where ague is prevalent. About 1853 he had distinct quotidian, and during three years was often subject to recurrences of similar disorder.

Case 4.—G. S—, æt. 30, admitted June 5th, 1857, works in sewers. He was in Kent ten months ago, no one had ague in the place to which he went; he remained there fourteen days. After this he returned to Paddington, and has been working there ever since, not near the canal. Tertian ague began nine weeks ago, it ceased after treatment in six weeks, but ever since he has had neuralgia of both sides of the chest at the lower parts, with sinking sensation, and occasional burning heat flushes.

Case 5.—L—, æt. 19, residing not far from Paddington canal, has a decided attack of ague, never having suffered from it before, nor having resided in any known malarious district.

Case 6.—S. A. F—, æt. 15, admitted May 13th, 1857. About fourteen days ago had tertian ague for the first time. It came on without any known cause. She came from Norfolk to London; there was no ague in the part of Norfolk from which she came.

Case 7.—May 5th, 1857. A policeman, æt. 25, living at Walbrook, in the city, employed on night duty, has tertian ague, the rigors occurring every other night. He was previously a carman at Maidstone, of most abstemious habits, had no ague before he came to London, where he had been about eleven weeks before the disorder came on.

Case 8.—J. S—, æt. 33, male, admitted April 8th, ill about a month, never had a day's illness before, never was in Kent or Lincolnshire, has been in London eight years. Ascribes his illness to a cold. His illness began with rheumatoid swelling and pain of hands, in about fourteen days this subsided, and marked quotidian ague appeared, which continued a few days, was arrested by quinine, and after a week relapsed again.

Case 9.—C. M—, æt. 32, male, admitted May 16th, ill three weeks with tertian ague, which he thinks he got while working in wet in Russell Square. Never had ague before, never was where there was ague, has not left London for thirteen years. Always a healthy man. Has had five paroxysms. Is sick and vomits in the cold stage. The ague was arrested by quinine temporarily, but he did not attend long enough for a cure to be effected.

Case 10.—J. S—, æt. 40, April 27th, 1863. Ill fourteen days with tertian ague. Was born and lived in a Lincolnshire fen, people around her often had ague, but she never had it; left her home at æt. 14, and resided in Cambridgeshire and Lincolnshire. Has been in London twelve years, never had ague till now, nor any particular illness.

My friend Dr. Brinton related to me the following case which occurred in his hospital experience. An omnibus driver who had always been in London suffered with inflammation of one eye, which had resisted all sorts of remedies for a long time during which he had been under another physician's care. Taking the hint that there occurred a slight remission in the course of the day Dr. Brinton gave him full doses of quinine, which acted magically, and he was soon well. I could easily add other examples to the foregoing, but they seem to me sufficient to prove that London during the last twelve or fifteen years at any rate has been capable of generating an influence giving rise to well-marked ague. Case 10 proves either that London may produce ague, or that it may call into activity a latent predisposition contracted in a malarious district, and which that locality did not render active. In either case the occurrence is sufficiently significant. The chief value of the facts above adduced is in my opinion the proof they afford that in obscure cases of disease of the nervous system occurring among ourselves it is right and necessary to take into account in forming a diagnosis the *possible* presence and operation of a malarious taint as the cause of the symptoms. This is no mere hypothesis, I am convinced from experience of the soundness of the view.

The same seems to be the case at Paris.

Jaccond writes ('Leçons de Clinique Med.,' p. 550), "I have told you that our patient had never inhabited regions subject to fevers, and that he had already lived for many months at Paris; it is certain that it is actually here that he has contracted his intermittent fever, and I wish, while speaking of this, to put you on your guard against an erroneous opinion—to the effect that these fevers are very rare in our city. It is possible that they may have been so at a certain epoch, but they are by no means exceptional since the great works have been undertaken, which have so deeply disturbed our soil. It was precisely on works necessitated by piercing a new road that our patient was occupied when he was taken ill; the ground he told us had been completely broken up, the men were working with their feet in the water, and though artificial, these temporary marshes have nevertheless a hurtful power of which we have had the proofs often for some years past. One would expose oneself to continual mistakes if one neglected to take intermittent fever into account because the patient had never quitted Paris; the telluric conditions are modified, the pathology of the region is so equally, and you must not lose sight of this new obligation of practical diagnosis.

It ought to be remembered that malarious disorder is very multiform, and that especially in London for one case of actual ague, we may have fifty of variously modified disorder. The following is an instance. A medical friend, who had twice had ague, and had resided in a malarious district, but had been for some time in London, experienced for three consecutive mornings chills occurring at 11 a.m.; on the fourth morning he had instead acute neuralgia of the neck and shoulder at the same hour, on the fifth he had neither chills nor neuralgia, but epistaxis at the same time; he had not provoked it in any way. The obscurer disorders of malarial origin are almost 'legion.' Schramm mentions the following as having come under his notice more or less frequently in the course of 8 years—inflammation of the eyelids, intermittent catarrh of the intestines, severe inflammation of the larger bowels with great pain and bloody stools, inflammation of the urethra with swelling and purulent secretion, epistaxis. Trousseau enumerates spasmodic coughs, hiccups, hemicranias, asthmas, insomnias, and periodic fluxes mucous or bloody from the nasal fossæ, the intestines, or the uterus as marked forms of malarial poisoning. The list might be almost indefinitely increased. Dr. Morehead says "there are many phenomena which may be taken as indicating the presence of this influence (malaria), as restless nights, pain of limbs, frequent yawning, depression of spirits, giddiness, booming sounds in the ears, a sense of faintness or chilliness with vomiting, defective secretion of the liver leading to pale alvine discharges without jaundice, defective irritability of muscular fibre leading to a feeble, sometimes intermitting pulse, to constipation, and dyspeptic symptoms. In these phenomena if watched a marked periodic tendency may often be observed. They are more apt to occur at periods of considerable atmospheric change, and very frequently about full or new moon. All these symptoms are very distinctly controlled by the use of quinine. The occurrence of night paroxysms of malarious fever is a familiar fact. These phenomena of the lesser influence of malaria may occur at the same diurnal period. In this way the restless nights may be explained. At all events there is no doubt that 5 or 6 grains of quinine given at bedtime under these circumstances more certainly induce sleep than opium ('Dis. in India,' Vol. i, p. 254).

Mr. Hyslop describes constant vomiting after meals as one of the results of malarious infection. It affected the whole of a considerable party of Europeans located at Mohamreh, as well as their visitors, and could not be traced to anything in the diet. A very strong reason for acquainting ourselves thoroughly with the obscurer forms of these affections is, that they are not self-limiting, like our ordinary continued fevers, but are evermore, unless arrested by remedies, prolonging their weary course by perpetual relapses and recrudescences. I doubt if any diseases are more wearying and distressing than those I am now alluding to.

The first I shall more particularly notice is a disorder which is by no means uncommon in young children between the ages of 2 and 10 years, and to which I have given the name of Malarioid Remittent. It has quite the character of a re- or intermittent fever, the paroxysms occurring at night, while the day is more or less free. The illness commences gradually, and has often lasted several weeks before the little patient is brought for medical treatment. It is usually regarded at first as some casual derangement of the stomach or bowels even by medical men. In well-marked cases there is drooping, languor, fretfulness, and loss of appetite by day, while at night the sleep is restless and disturbed, and not unfrequently there is considerable delirium. This delirium may be the prominent, indeed almost the only symptom, of which the following is an instance.

Case 11.—E. P—, female, æt. 3½, admitted May 11th, 1869. Ill with pertussis 3 months, has attacks now 7 or 8 times a day. Air enters lungs well, producing a little moist râle. Appetite very bad. Bowels right. Gets very feverish several times by night and day, is not more feverish at night, seems quite free from fever now, but her temperature is 39° C. (102·2° F.). Pulse 135, weak. Sweats much at night. Is very weak. Tongue moist. Cries for cold water. Gets red all over, legs and face and all, two or three times a day. Ferri et Quinæ Citrat. gr. iv + Spt. Œth. Chlor. ♏iv + Aq. ℥ss *ter die.* 13th.—Better, but is always wanting to lie down. 20th.—Is better, sleeps better—Pt. Ol. Morrh. ʒij *semel die.* June 3rd.—Is well, sleeps well, is cheerful.

The prostration, anorexia, thirst, accelerated pulse, and elevated temperature perfectly mark the presence of fever in this case. The nocturnal sweating and the occasional cutaneous hyperæmia may reasonably be referred to paretic conditions of the vaso-motor nerves. That the treatment was efficacious can hardly be questioned.

In very many cases some of the organs are more prominently affected than others. Thus we may have cerebral, or thoracic, or abdominal symptoms, which will simulate and sometimes very perplexingly substantive disease of the various viscera. I shall adduce instances of each.

Case 12.—T. M. A—, æt. 2, male, admitted January 10. Ill 14 days. Had two fits at first, and one last night; during the fits, and at other times, beats his head as if he had pain in it, and works his occiput against the pillow. Always screams when pain takes him in the head. From 5 p.m. to 5 a.m. is very restless and delirious. Is dreadfully irritable even in the daytime. Has only vomited once, and that was yesterday. No typhoid spots. Pupils of medium size. Knits his brows. Head rather hot, and skin generally. Bowels costive. No appetite. Tongue clean. Pulse feeble and quick. Hirud. ij temporibus. Hyd. c̄ cretâ gr. ij *h.s.* Quin. disulph. gr. i *ter die.* 13th.—Had a double dose of quinine last night, and passed a very good night, did not disturb his mother once. Healthy motions. Quin. disulph. gr. ij o.n. Pt. c̄ gr. i *bis die.* 17th.—No fever now, head cool; has fair nights. 31st.—Sleeps much better; looks very well, but has no appetite. Omitte mist. Hyd. c̄ cretâ gr. i *alt. noct.* February 7th.—Much better. Discharged. It is not too much to say that there was grave reason in this case to fear the existence of meningitis, probably tubercular. No doubt there was considerable hyperæmia of the brain, but this was more from arterial dilatation in consequence of vaso-motor nerve paralysis than from actual inflammation of the cerebral tissue. As the nerves were toned, and the vessels contracted, the hyperæmia subsided. Had a different plan been pursued, as repeated doses of calomel, it is highly probable that the case would have terminated unfavorably.

The next variety I shall notice is where chest symptoms predominate.

Case 13.—E. L—, female, æt. 6, admitted February 2nd. Ill a week. A fair, pretty child. Has violent cough; no appetite; some days has much fever. Is very restless and coughs badly at night. Tongue red and coated. Pulse quick and weak. Good breathing all through both lungs. Is worse at night, and very thirsty. Subject to these attacks every five or six weeks since her infancy. Ferri et quin. citrat. gr. v *ter die,* grey powder and rhubarb twice a week. In a week she was sleeping much better; in fourteen days the cough was almost gone, and the appetite was very much better. By March 12th she was well.

Case 14.—W. D—, æt. 8, male, admitted September 6th, having been ill on and off since he had an attack of the same kind fifteen months ago. Blue eyes, light air, intelligent face, rather prominent forehead. Is very fond of reading. Has lost much flesh. At times has a "nasty dry cough." Complains of uneasiness at the lower part of the sternum. Good breathing in the backs, some crepitation is heard below the right clavicle. Abdomen normal. Skin hottish, with perspiration on face. Does not sleep well at night, rambles and talks. He varies much, one week he is all life and spirits, the next much depressed. Hydrocyanic acid and salines *ter die.* 9th.—Lies sleeping very much by day; is pretty quiet at night; takes food fairly. Râles are heard over both fronts and backs. Quin. disulph. gr. i *ter die.* 16th.—Seems quite well, is up and running about. Cod-liver oil was now given with iron and quinine, and in another week he was discharged well.

In the first of these two cases there was nothing remarkable except the cessation of the cough without the use of any sedative. In the second the resemblance to phthisis was so considerable that I paused a few days before I gave tonics. The physical and mental constitution of the child, the emaciation, the cough, the sub-clavicular râle, with the febricitation, pointed very much in the direction of tuberculosis. The extension of the râle all over the chest a few days later warranted the hope that the chest affection was only catarrh, and the result of tonic treatment soon made the case quite clear.

Case 15.—A. E. D—, female, æt. 2½, admitted March 10th. Ill two months. Looks seriously ill, has emaciated rapidly the last week. Has a bad cough, wheezy respiration; no appetite. Bowels costive. Skin hottish. Tongue coated at back, tip red. Thirsty, likes cold drinks. Lips pallid; legs cold. Very fretful, very restless at night, but not delirious. No dulness, but moist crepitant râles all through posterior parts of both lungs, harsh breathing in fronts. Father died consumptive. This child, as she lay in her mother's arms, looked so ill, and the symptoms, together with the history, pointed so much in the direction of tuberculosis (diffused miliary) that I felt very desponding as to the result. But there was just a hope that the disease might be malarioid fever with chest complication; and as this was far the more hopeful view, I resolved to act upon it. It was quite clear to me that it was not a case of mere ordinary bronchitis, the peculiar and deep prostration evidently betokened either fever or some grave organic disease. Turpentine stupes were ordered to the backs, pulv. Doveri gr. iij *o. n.* and quinæ disulph. gr. i *quater die* dissolved by citric acid in citrate of potash saline. 17th.—More cough, but appetite much better; has slept pretty well; much less rale in backs, air enters freely. Quin. disulph. gr. xx acid. sulph. dil. q. s. liq. opii sedat. ♏xxx, aquæ ℥vi ♏℥ss *ter die.* Pt. pulv. 24th.—Much better, much better night's rest; cough still troublesome; clear breathing without râle in both backs. Pt. Ol. morrh. ʒi *ter die.* April 18th.—Quite well.

Abdominal complications are more rare than I should have expected, they occur both as neuralgia, diarrhœal, or dysenteric purging.

Case 16.—E. B—, female, æt. 6, admitted April 7th. She had been ill one week with a bad cough and much expectoration, could not rest at night and moaned in her sleep. During the first week a cough mixture containing chloric ether was given, grey powder, and rhubarb. 14th.—She complained of very severe abdominal pain, which, however, did not seem like that of peritonitis, and lay in bed constantly whining and crying. She was very weak, and perspired very profusely. No thirst. Bowels open. Urine red and thick. Coughs much, but there are no râles in the chest. Heart's sounds normal. Cat. lini abdomini. Ferri et quin. citrat. gr. v + acidi hydrocy. dil. ♏ij + liq. opii sed. ♏ij + aq. ℥ss *ter die.* 17th.—She had ceased to complain of pain in the abdomen, but was feverish, thirsty, and perspiring dreadfully, and had pain in her legs. Tongue moist and clean. Pt. 21st.—Much better, but fearfully weak, and seemed to have lost the use of one of her knees. 28th.—Much better, but still very weak, can move her knees better. She continued iron and quinine with ol. morrh. for another month, and made a good recovery. About a year later she came under treatment again with similar disorder, only that there was now chest affection instead of intestinal. With iron, and quinine, and oil, she again recovered well.

Case 17.—H. J—, male, æt. 5, admitted April 19th. Ill four weeks. Skin hot. Pulse rapid. Breathing rather harsh in both backs, without much râle. Abdomen not very tense. Bowels relaxed much, motions very offensive. Emaciated greatly, used to be very stout. Slight cough. I gave him at first grey and Dover's powder *ter die* and ol. morrh. After three days the powder was given at night only. 26th,—Looks very ill, lies in his mother's arms utterly prostrate. Bowels have been quieter, but are more relaxed again. No appetite. Pt. oleo. Bismuth and opium *post sing. sedes liquid.* May 3rd.—Much more appetite. Bowels quiet; motions very dark and offensive. Pt. c̄ mist. et oleo. 24th.—Bowels are in much better state, but still apt to get loose; has had marked pyrexia, but there is less now. Sweats most copiously at night, and by day if he sleeps. Gaining flesh. Quin. disulph. gr. xviij + acid. s. dil. q. s. + liq. opii sed. ♏xxv + aq. ℥iss—ʒi *bis die.* After this he improved decidedly, the sweating diminished, and he was well in three weeks.

In both these cases there was exceeding prostration, which, in the absence of sufficient organic disease to account for it, should always direct our attention to the nervous system. In both also there was very copious sweating, which is often, with due regard to the circumstances under which it occurs, a valuable indication of a neurolytic state, and of the need of nervine tonics. The neuralgia in the first case was as evidently dependent on debility of sensory, as the sweating was on a like state of vaso-motor nerves. In the second case both the intestinal and cutaneous fluxes evidently resulted from the same nerve disorder. At the time the latter case occurred I was less familiar with malarioid remittent, or I should have given the quinine much earlier. In place of sweating a roseolous rash sometimes occurs, which is evidently a phenomenon of the same kind produced by flushing the capillaries of certain districts of the skin with blood through relaxed arteries. The circumstance whether the hyperæmia affects the superficial strata of the skin, or the deeper, is probably one of the causes which determine whether there shall be a roseola or a diaphoresis. I think that no one can observe such cases as those I have related, and which it is difficult to describe fully without being struck by the confirmation they afford to the doctrines stated at p. 18, *et seq.* The phenomena in some instances are as instructive as any experiment.

There is one symptom I have not mentioned which is extremely well marked in many cases of this fever. It is met with certainly in other morbid conditions, but yet it is a valuable sign, and may aid materially in establishing the diagnosis. Wherever it occurs I believe it may be taken as an indication that there is considerable nerve debility. The symptom I refer to consists in a peculiar dark, rather broad, rim beneath the lower eyelid, deepest in tint near the inner canthus, and gradually lessening in shade as it curves outwards. It is most evident in the early part of the day, and would not, I think, be observed when fever was present. As to the cause of this appearance I am uncertain, it may be owing to actual discoloration of the skin in this part with morbid pigment, which becomes more evident when there is pallor of the surface. The disappearance of the dark rim as recovery ensues would, however, be against this view.

This fever is evidently not identical with the classical remittent fever of children, which is usually regarded as typhoid. The latter is, in my experience, far from being a common affection, while the one we have been considering is decidedly frequent. The influence of remedies is besides so marked in the malarioid fever that it cannot for a moment be ranked with typhoid. I have made no post-mortem examinations, but I cannot conceive that they would strengthen essentially the evidence already adduced. The term malarioid is, I think, quite justified both by the character of the phenomena and the marked success of quinine. The occurrence of such fever is a further evidence of the existence of aguish miasm of actual London origin. As to season of the year there has not appeared to be a very marked prevalence in one period rather than in another. In the last three months of the year it seems to be more frequent than in April, May, or June, and about as frequent as in July, August, and September.

The following history is, I think, one of much interest, though it will seem to many at first sight that it has little claim to be placed in this volume.

Case 19.—St. C—, æt. 3½ years, male, admitted May 9th, ill three weeks. The abdomen has gradually enlarged without pain or tenderness; no other morbid condition preceded except some failure of health.

The feet and legs are natural. The abdomen is dull and fluctuating, is considerably distended; when he is turned to one side the upper does not become resonant, there is resonance only in the epigastrium. The liver does not descend below the ribs. All the time he has been ill his appetite has been lost, and he has emaciated much. Heart's sounds normal. Natural breathing in both backs. Tongue clean. Urine not free, not red. Bowels much relaxed, five or six times daily. Another child died lately with large abdomen in two days. The urine examined three days later was scanty and lateritious, but free from albumen. On May 23rd the urine was very alkaline, scanty and thick, deposited phosphates, and contained a vast deal of carbonate of ammonia. The quantity of peritoneal effusion was undiminished. He slept very sound and perspired very much at night. May 30th.—Urine still alkaline and effervescing strongly with nitric acid. Appetite now very great, is always asking for food. June 9th.—The urine was more free, acid, and not albuminous; his health was much improved, and the quantity of fluid in the abdomen had very much diminished. July 7th.—Discharged perfectly well, better than he was before his illness. The treatment consisted at first of grey and Dover's powder āā gr. ij *ter die*, with iod. pot. and nitre mixture; after three days this was changed for a diuretic mixture containing digitalis and ungt. hydrarg. to the abdomen, as the bowels were very relaxed and the stools green. Four days later iodine was painted over the abdomen in place of the mercurial ointment and diuretics continued. Two days after this things were getting worse, he had passed no urine for twenty-four hours, the skin was blistered by the iodine. I thought the kidneys must be congested, and ordered a blister to each loin, and ant. pot. tart. gr. $\frac{1}{6}$ *ter die*. Three days later I had to omit this medicine, and I prescribed gr. i of quinine *o. n.* In two days there was some improvement, the urine was then as stated above on May 23rd; I gave then in addition tr. ferri muriat. ♏v *ter die*, which he took up to the time of his discharge.

Remarks.—At the time when I treated this case I knew much less about nerve disorder than I do now, otherwise I should have given iron and quinine much sooner and more boldly than I did. I suppose I need not say that I should not often advocate such remedies alone in dropsy. But this was a peculiar case in which the ascites had come on without apparent cause, where the kidneys and heart appeared to be sound, where, as the event proved, there was no peritoneal tubercle, but where there was, as the alkaline ammoniacal condition of the urine showed, great depression of vital power. Moreover, there was diarrhœa which, in the absence of inflammatory disorder or organic disease, may be fairly referred to paresis of the vaso-motor intestinal nerves. From some peculiarity in the child's system the peritoneal vessels became similarly affected to those on the mucous surface, and serous effusion ensued. It is quite clear that perseverance with diuretics would most likely have destroyed life, and would not have removed the dropsy. Tonics, on the other hand, by raising the general power, and contracting the relaxed vessels had the desired effect. The case was, I believe, one of obscurely-developed malarioid remittent. It is well known that dropsy is not an uncommon sequel of intermittent fever. Flint[1] mentions that in ten cases out of twenty-two of ascites the dropsy had supervened on more or less numerous attacks of this disorder. He thinks with regard to ascites generally that more success will be attained by resorting early to tapping, and relying more on tonic medicines, iron and quinine, than by confining treatment to the use of diuretics and hydragogue cathartics. The spontaneous decomposition of the excretions has been well pointed out by Dr. Inman as a sign of failing vital power. It was present very markedly in this case, and was no doubt the cause of the highly ammoniacal condition of the urine. There was no mucus in the fluid to act as a ferment; the decomposition can only be referred to an alteration of the normal properties of the secretion itself. Lastly, I would observe how strongly the case testifies against prescribing according to the mere name of a disease, and how it sets forth the necessity of studying the pathological condition existing in each case, as well as the "lædentia" and "juvantia."

Bierbaum in his remarks on ague in childhood (v. 'Schmidt, Jahrb.,' Vol. 118, p. 308) states that even in the declared disease the attack never begins with an actual rigor, but with repeated yawning, stretching of the limbs, remarkable pallor of the face, and whiteness of the lips, cold hands and feet, dryness of the skin. After the hot stage there is but little sweating. Anæmia and œdema of the feet are soon produced. The pernicious and masked fevers affect the soporose, convulsive, or neuralgic form, or the bronchitic, pleuritic, or dysenteric. Bouchut in his memoir on the same subject insists upon the importance of early diagnosis, because if not detected and properly treated ague is quickly fatal to infants. It rarely assumes the regular stages of heat, cold, and sweating; and the younger the child the more are these stages intermixed. Rigor scarcely ever exists; the child becomes only blue or greenish-white from head to foot, and the nail-ends become blue. This period of "concentration" lasts about an hour, then comes the period of expansion, which is manifested by a rosy colour of the skin, and burning heat, the sweating is never so marked as in adults. The periodicity is also modified. The fits assume a variable type, but approach the quartan; they recur daily, but very irregularly at different hours. When this fever has lasted several weeks or months the consecutive anæmia appears, and the child has the greenish-yellow colour characteristic of paludal infection, and so common in Sologne. With, or after the anæmia, comes the cachexia, with emaciation, general debility, enlargement of the belly, especially in the region of the spleen. In much protracted miasmatic poisoning purpura or hæmorrhagic spots extend over the skin ('Syd. Soc. Jb.,' 1865-66, p. 431).

---

[1] 'Amer. Jour. of Med. Sc.,' April, 1863.

M. Guiet in an interesting communication relative to pernicious fever in young children, relates the following case ('Ann. par Jamain,' 1859, p. 7).

Case 19.—B—, æt. 23 months, suckled, of strumous habit, was taken with malaise, fever, vomiting, anorexia and constipation. The child dribbled much. Some days later the vomiting was almost constant, the fever which was smart was markedly exacerbated every evening. The breathing was short, incomplete, suspirious. Profound stupor was succeeded by convulsive agitation and cries, especially at night. The eyes could not bear the light, and were constantly closed. The tongue was coated. On the evening of the third day after he was seen the child had a convulsion and appeared dead. The next evening, after slight improvement, a fresh seizure came on, after which the right arm was paralysed. On the 5th morning the child was so ill that it seemed impossible he could survive the day. He was pulseless almost, utterly wasted, the bowels acted involuntarily, the cornea was glazed, the skin of the nose shrunken and covered with a pulverulent earthy matter. Though devoid of hope, and half reproached for tormenting a dying child, Guiet had 15 grains of quinine administered in an enema. This was retained, and in the afternoon the child was still living, had showed some consciousness, swallowed a little eau sucrée, and for the first time had had a rigor. The extremities were cold, the respiration slow, the pulse small and weak. Quinine was given in grain doses every 2 hours, and in 48 hours it might be said a resurrection had taken place, which terminated in complete recovery. The child evidently lived in a town, but, unfortunately, nothing is said as to the prevalence of malarious disease in the district.

Guiet, however, relates 2 other cases of infants which proved fatal, both of which show how suddenly the disease may destroy life. The first was a boy, æt. 3 months, who was tended as it seems by a nurse. This woman represented that the child was seriously ill, and stated that he had attacks of suffocation in which he became blue, but that they ceased as if by enchantment, when his parents visited him. She was thought to exaggerate, and Guiet when he visited the child could see no serious danger. Four hours later, however, he was dead. The dyspnœa had increased so that at the time of death his whole surface was cyanosed. This discoloration disappeared entirely some hours after death. Guiet says he believes this child sunk under an attack of pernicious fever which paralysed the pulmonary innervation, suspended hæmatosis, and violently caused death by asphyxia. In more scientific language we may say, as Dr. G. Johnson has taught us, that the ramifications of the pulmonary artery were affected with spasm, and thus the blood prevented from being sufficiently aërated. A temporary spasm of this kind well explains the phenomena of the case.

The sequelæ of Malarioid Remittent in children are sometimes grave. The following is an example:

Case 20.—L. P—, female, æt. 5, seen November 7th, 1864. Has had fever, which commenced 10 weeks ago; she was very ill, took only cold water, was very weak with perspiration. When she got better of the fever she could stand when taken out of bed, but every day afterwards she got weaker till she was quite unable to stand. At present she can stand, but not hold herself upright, seems to have pain in the back when she tries. In attempting to stand she leans on a chair, bending very much forward, and crying as if suffering pain; when she attempts to walk the pain is increased. There is no sufficient evidence of disease of the vertebræ, but she is so very irritable that it is impossible to examine properly. She drags the right leg, always lies on right side. Before this illness was healthy, and strong, and very useful to her mother. Appetite none. Is thirsty. Tongue pretty clean. Bowels much confined. Sleeping badly lately, perspires very much at night, but has no delirium. Is very irritable, which is not her natural state. Urine very dark, rather scanty, good breathing throughout both lungs, heart's sounds natural. Ordered Citrate of Iron and Quinine gr. iv *ter die*, and Ol. Morrh. ʒj *ter die*. During the next week she had much prostration and sweating, halted on the right leg, rested on the toes, and could not put her foot to the ground, was pallid. The next week there was decided improvement, some lichenous eruption on both arms, copious sweating still at night. She took food well. At the end of the third week she walked without pain, but halted on the right foot, and seemed unwilling to put it to the ground. When, however, she was lying on a couch the right limb could be moved pretty freely, and the joint surfaces pressed together without causing pain. The night sweating continued, and there was much lichenous eruption. The tenderness in the lumbar region of spine was less. She moved about a good deal of her own accord. The dose of Citrate of Iron and Quinine was increased to 7 grains *ter die*. By December 5th she walked quite well, and eat enormously, there was still much lichenous rash, which itched much, but she perspired less; she was very cheerful and merry. By 21st she was quite restored. In this instance the fever left behind a state of hyperæsthesia of the nerves of the right lower limb, which together with some appearance of swelling in the right loin raised for a time considerable suspicion as to the existence of disease of the hip or of the lumbar vertebræ.

In another case of the same age the child after some 5 weeks' illness was so weak that she fell down if she tried to stand. She felt quite sore when she was moved, and dressing her, as her mother said, was a terrible affair. In the day she had but little pyrexia, her pulse was 78, her temperature 100°, but at night she became much hotter, and perspired very much. Her sleep was interrupted by repeated screaming. No eruption. Aspect not stuporous, but languid. Tonics were of no decided benefit, but with change of air she improved decidedly, and when I saw her 11 weeks after her first visit there was much less febrile prostration, but she was still languid by day and perspiring at night. The most marked feature of her condition, however, was the paralysis of the Tibialis Anticus and other muscles on the front of both legs. Her toes were pointed, the heels being drawn up by the calf muscles. Faradisation had no effect on either the anterior or posterior muscles of either leg, but galvanism, the positive pole to the muscles, the negative in the hand, with interruptions, made the anterior group contract readily. This means was employed for several days, but without any recovery of voluntary power, and it was clear that (tonics also availing little) removal to a purer air was what was most needed. Here the consecutive nerve disorder took the form of musculo-motor paralysis instead of sensorial, as in the first case. I have never seen such results in any instance of typhoid, and though I did not witness the symptoms during the full fever period of the first patient, I cannot believe that her malady was ordinary enteric fever. Possibly it was paludal enteric fever (J. Harley) with the paludal element unusually developed.

The next subject I propose to notice refers to a disorder essentially similar to that we have just considered, but presenting usually much less distinct symptoms, and affecting adults. This is the "*obscure remittent*" of Dr. Macculloch, which is often a very anomalous and difficult disorder to deal with. Persuaded as I am that such a disease exists, and is not very rare, I feel strongly the need for sobriety of judgment and careful investigation before concluding that in any given instance the disorder is really of this nature. As the nervous system is prominently affected, as the febrile manifestations may occur at night, and seldom, perhaps, be well marked, as the disorder is chronic and often obstinate, and apt to be attended with anomalous symptoms, it is no wonder if the perplexed practitioner is much disposed to vote it all hysteria or hypochondriasis.

I must refer here to the section on hysteria for the grounds on which our diagnosis from that state should be based, and will only remark that we should be cautious in using an ill-understood term to designate that which we feel ourselves to be obscure. Of course due pains should be taken to discover any existing organic disease, or any pernicious habit, or consuming mental distress, which may account for the bodily suffering. Supposing, however, that none of these can be detected, or appear adequate to explain the morbid phenomena, it is well worth considering whether the patient be not labouring under this form of malarioid disease. Besides the possibility of the disorder having originated in London, which has been proved by the evidence I have adduced, it should be considered how very practicable it may be for an individual on a journey of business or pleasure to "pick up" an aguish taint at some place where the causes of it are rife; and those who have most experience of such matters I believe will agree with me that, like syphilis, such a taint once contracted is with difficulty ever shaken off, at least as long as the subject of it is exposed to the wear and tear of an ordinary active business life. The existence of the obscure remittent among us is fully recognised by Dr. Copland, whose world-wide experience of the morbific action of malaria makes his testimony peculiarly important. Writing about 1850 he states that he believes malaria to be far oftener present than has been imagined, more especially of late years, and around the metropolis. He adds, that "by mistaking this fever for other diseases the sufferings of the patient are often materially aggravated, whilst, having recognised its nature and cause, not only the means of cure but those of prevention become obvious." Between cases of a milder and more obscure character there intervene all grades up to those where the symptoms of bodily disease are evident and striking, although the nature of the efficient cause may be matter of great question. I proceed to relate sundry cases in illustration of this subject, taking first those of the more positive stamp just alluded to.

Case 21.—G. R—, æt. 32, a carpenter, admitted July 19th. Generally has good health; has been ill three weeks. He was first attacked at Dover with shivering occurring every night, followed by violent sweating; he had pains in the knees and soles of feet. He still shivers every night more or less, but has no sweating. He complains of debility, pain at the back of the head, and exhaustion on the least exertion; has bad nights; no appetite. The pulse is very feeble, the tongue covered with white-capped papillæ, skin cool. Bowels costive, urine dark coloured. Has pain across loins and in the left shoulder. The stomach and intestines are shrunken, there is no enlargement of spleen or liver. The thoracic organs are healthy. Pot. iod. with ammon. carb. and tr. cinchon. was given at first for three days, besides two doses of calomel and colocynth, but without any advantage. 22nd.—The stomach can retain only milk and beef tea; there is no epigastric tenderness. He is so feeble that he can hardly stand. Quin. disulph. gr. iij *ter die.* 25th.—Somewhat better. Pulse very weak. Urine exceedingly dark coloured. Pt. c. quin. *quater die.* Chop and porter. From this time he went on steadily improving, and was discharged well August 12th. As he improved the urine became of a much lighter colour.

This man undoubtedly had quotidian fever, though while under my care the febrile symptoms were but slightly developed. It would be more exact to say that he was under the toxic influence of malaria which caused the remarkable prostration. It did not appear that there was any other cause for his extreme debility, and the speedy way in which he rallied under treatment founded on this view confirms the opinion. The source of the poisonous miasm was by no means clear; if produced at Dover, as seems most probable, it certainly suggests the possibility that other towns may have the same undesirable privilege. The very dark colour of the urine, while the sp. gr. was moderate, shows that considerable waste was taking place in the blood-globules, whose decay furnished the abundant pigment. The arrest of this decay by quinine is a fact I have often observed; it seems to indicate that this wonderful nervine acts in part through the nerves on the blood in the vessels, diminishing over-active vital changes. The beneficial action of alcohol in acute disease is probably of the same kind.

Case 22.—W. C—, male, æt. 32, excavator, admitted September 16th. Ill four months, his illness came on gradually. I have no note as to his having been in any known malarious locality; my impression is that he had not. He seems to get worse every week. Aspect anæmic. Has the appearance of a man affected by some serious disease; his speech is slow and hesitating, and his whole manner of the same kind. Has headaches at night. Is very ill in the morning, can hardly draw his breath, and has cramps in the legs. Takes food fairly. Not much cough or expectoration. Skin cool. Feels very weak. Pulse feeble. Heart and lungs sound. Quin. disulph. gr. v *ter die.* In three days he was much better; at the end of seven he was still improving, and some neuralgia had appeared in the left frontal nerve. Soon after this he ceased attendance. This man had never had ague, and there was really nothing distinctive on which to found a diagnosis. The absence, however, of any organic disease which could account for the great prostration was strong ground for regarding the system as labouring under some serious toxic influence, and as the symptoms did not appear to be those of the ordinary continued fevers it was reasonable to attribute them to malaria.

Case 23.—Mr. S—, æt. 40, seen August 24th. Was born and lived at Wisbeach twenty-two years ago; never had ague. He has suffered from catarrh five weeks; bowels have been loose until the last few days; has a hollow cough, almost dry. Is emaciating much and losing strength. Has drenching sweats at night. Skin damp. Pulse weakish. Lungs emphysematous, heart displaced, and liver lowered. Last four days has had pain across upper abdomen, not increased by food. With quinine + iron in pretty full doses he recovered, but his improvement was slow. It is not uncommon to meet with cases in which by day there are only symptoms of general debility, while at night some special phenomena of nerve disorder ensue. In one instance a female, æt. 32, stated that she woke up with a shivering fit at night about 1 a.m.; the rigor lasted ten to fifteen minutes, was attended with palpitation, and succeeded by faintness and a sense of dread. With quinine gr. iv at 6 and 9 p.m. the attacks ceased. Another, æt. 31, after an asthenic bronchial catarrh, complained of having much palpitation, which came on very often at midnight, she woke up in trembling and perspiration. Another, æt. 40, who had been ill about four months, and had sickness and violent retching of a morning with some bowel disorder, described herself as waking up in bed at night in a state of semi-syncope. She benefited very much by quinine and change of residence from the vicinity of a canal.

The following instance is related to Malarioid Remittent, but its causation was more apparent than in most cases of that malady. A boy, æt. 11 or 12, after an attack of influenza, which set in suddenly with vomiting and diarrhœa, not of long duration, suffered with pain in the head coming on at intervals with something of a tertian or quartan periodicity, and attended with languor or prostration. His appetite was great, much greater than when he was in his usual health, he slept well, was often cheerful, had a perfectly normal tongue, pulse, and temperature, but very great thirst. He had been ill about 12 days when I saw him, and in a few more he was well. The connection of intermittent headache, bulimia, thirst, and occasional prostration is very curious, and indicates clearly the neurotic character of the disorder.

Case 24.—X. Y—, a strong-made medical man, æt. 40, until lately resident in the country, where he had for a long time been overworked, especially with midwifery at night. He suffered from irritability of the urethra at intervals, especially after great fatigue. His great distress now (June 13th, 1859) is from shifting rheumatoid pains, which remain scarcely more than two days in one part, but during his time make the affected part very tender and sore—they haunt the loins, hips, and shoulders. Muriate of ammonia has been taken but without benefit. He takes food tolerably well. Urine = 40 oz. in twenty-four hours, sp. gr. = 1020, contains no uric acid. He complains of exceeding exhaustion, is even unable to read, which he is usually very fond of. His nights are wretched, he gets out of bed more than twenty times to change his position, as he is unable to turn in bed. Much perspiration at night. Tongue flabby. Pulse soft. Skin cool. A fortnight later, after he had improved in the interval, he had two very bad nights, the last was particularly bad. He had not ten minutes' sleep from distressing muscular spasm almost like tetanus, such that while lying on his back he could not breathe, and was compelled (though no chicken) to shed tears. When I saw him his pulse was open and very soft, and his skin damp. He told me that at night the part of the bed where he lay was so drenched with sweat that it might literally have been wrung out. I advised him to take gr. x of quinine at bedtime and two hours previously. He took this, went to bed, and lay quiet without spasm, but did not sleep for two or three hours; then he took a full glass of port wine and slept well for three hours, after which he awoke, took more wine and slept again, so that he had a fairly good night. July 11th.—Has been taking about gr. 20 of quinine every night, and wine, has decidedly improved, but feels sore and stiff in various parts, and perspires copiously still. Urine deposits uric acid now pretty freely, the twenty-four hours' amount = 5·53 grains. Relishes his port wine greatly and longs for it. 12th.—Was quite delirious last night, and is exceedingly shaky to-day, walks tottering, and feels as if he should fall. 21st.—For some days has had ferri et quin. citratis gr. x + tr. arnicæ ♏ xv *ter die*, and is greatly better, sleeps better. 26th.—Last few nights not so good. Quin. disulph. gr. v *bis die*, and gr. x *o. n.* 28th.—Is quite jolly and strong, two excellent nights, some rheumatism with swelling about ancles. Aug. 27th.—Has been going on very well, taking gr. x to xx of quinine daily until this morning, when severe purging and vomiting set in; he passed a gallon or more of pale liquid, had cramps in abdomen, and felt chilly and depressed. Purging stopped by sulphuric acid, spt. æth. s. co., and tr. opii. Thinks he is better than he has been for between two to three years, but still has the severe pain at night in the muscles of the back, which prevents him from turning in bed, and forces him to get out at the one side and in at the other. Sept. 17th.—Is in greatly better health than for a long time, in excellent spirits, gaining flesh, has better nights, but still requires wine then, and has to get out four or five times to change his position. He can walk but little. His bladder is much less irritable than it used to be, it will hold now 9 ounces, whereas last year it would only hold 3 ounces at a time. Oct. 5th.—His chief complaint is now of his feet, which get very swelled and painful at night, more so than they used to be. They are easier after a night's rest, but very stiff, and do not subside to their normal size. Occasionally, when he has had sharp sciatic pain, the feet have been much better. Dec. 13th.—Feet exceedingly tender and painful, so that he can barely walk; no quinine taken for a long time. Much depression. Pot. iod. gr. iv + ammon. carb. gr. v + tr. cinchon.

ʒiss + dec. cinchon. ℥j *ter die*. Sulphur-fume bath. 17th.—Can walk now very much better. March 20th, 1860.—Is now so far recovered that he can walk six miles without much inconvenience. He sleeps sound for five and a half hours at night, but is obliged to be lightly covered and to have the window open to avoid sweating. I have often seen him since and know that he is in fair health.

Remarks.—The exceeding causeless exhaustion, the great depression, the sleeplessness, the muscular spasm, the drenching nocturnal sweats, the delirium on one occasion, the beneficial effects of quinine and wine, and the asthenic rheumatic affection are very noteworthy points in this case. Mere asthenic rheumatism it certainly was not. Some potent toxic influence must surely have been at work so to prostrate a robust system which had long successfully battled with difficulties. This could hardly have been the less healthy atmosphere of London, because the effect of this would have been less acute, and would rather have increased than diminished as time passed on. That the nervous system was especially affected was clear both from the symptoms and from the good effect of persistent tonic treatment. The under current of rheumatism, which became so prominent as the symptoms of debility and prostration gave way, seemed to me to have a common cause with the rest of the disorder; reminding me very much of the case of a relative of my own who was invalided and sent home from India for sub-acute rheumatism, but recovered completely by the change to a colder climate. In this and many like instances nerve debility, however occasioned, goes for very much more I am persuaded in the treatment of disease than any *materies morbi*. It is very worthy of notice that while the uric acid was absent from the urine at the time of the greatest depression, it increased and attained to a tolerably good figure as the general condition amended. This I have observed in other similar instances. It is by no means only in gout that the uric acid is deficient in the urine; this is also the case in various conditions where nutrition is much impaired. The patient was a man of more than average fortitude, endurance, and intelligence, and a better instance could scarcely be adduced of the severe and long suffering inflicted by this obscure malady. With a feebler system, or a less courageous spirit I think it far from improbable that mental derangement might have ensued.

Case 25.—Mrs. F—, æt. 55 (?), seen July 27th, 1864. Had ague 30 years ago, not since. Resides in Paddington. Is usually a healthy, hearty person, not troubled with indigestion or nervousness. Has been ill about 10 days, illness came on rather gradually. Has occasionally had chills since she has been ill, is very weak, feels a want of stimulants, takes 4 to 6 glasses of wine daily. Has a variety of nervous symptoms, and especially a strong impression at times that she is dying. She is extremely restless, nervous, and apprehensive of danger, though repeatedly assured that there is none. Is quite sleepless at night. Is confined to bed. Has strange imaginations, strange thoughts that there can be no reason for. In short, her state is one of great general prostration and weakness with hyperæsthesia and nervous disorder, but without much indication of fever otherwise. Not much thirst. Appetite indifferent. No eruption whatever. Pulse 96, not very weak. Tongue coated. Bowels not loose, open. Urine perfectly pale, aqueous looking, copious, not albuminous. Motions tolerably healthy. Has got rather worse the last week. She had at first more disorder of the stomach and liver than at present. Ordered Quin. Disulph. gr. ij + Acidi Nitro-muriat. ♏iv + Aq. ℥i *ter die.* She took this with very decided benefit, but not so steadily as she should have, and it was very noticeable that when she omitted it she had bad days and feverish nights, not constantly, but every 2nd or 3rd day. Towards the end of August she had febrile paroxysms at 2 a.m. every day, which continued slightly through the day. Soon after she went into the country, and in two days was quite a different being and recovered.

Case 26.—Ch. C—, æt. 34, sweep, a teetotaller, seen January 7th, 1866. Had ague 10 years ago. Complains of much abdominal pain with diarrhœa, is pale and weak, pulse fast and feeble. Astringents with opium and one dose of Hydr. c̄ Cretâ had no effect, though continued in full doses for some days. Tongue now covered with yellowish fur, more so at base. Rhubarb + Hydr. c̄ Cretâ made matters much worse. After a few days had a distinct accession of pain and copious fluid purging at a fixed hour early every morning. Quinine and opium soon brought the attacks to be on alternate mornings, but could do no more. Appetite, however, became very good under their use, and pulse improved. After he had taken quinine for 8 or 9 nine days the tongue became clean, but he had chilliness early every other morning, followed by pain and copious liquid stools. A combination of Arsenic, Quinine, and Strychnia seemed to have completely cured him for several days, when all the symptoms returned almost suddenly after a long walk which tired him. Change of air, though only from Marylebone to Kilburn, with the same medicine set him right. He returned to work February 19th.

In both these instances the system had received the malarious taint though long previous to the attack described, and it is quite open to question whether the original infection had any material morbid efficacy. At any rate there can be no doubt that its operation must have been very much aided by recent influences, since it had lain dormant in the system so long. Both may be termed cases of masked intermittent, but in the first the cerebrum seems to have been especially deranged; in the latter the intestinal nerves. In both the good effect of tonics and change of air was very apparent. In the second the influence of muscular fatigue is very apparent; it may be said to have caused intestinal sweating, just as it commonly does cutaneous. I am indebted to Dr. Palmer for the opportunity of seeing the first case, and for his notes of the second.

Case 27.—Mrs. T—, seen August 15th, 1863. A married lady, resident in South Belgravia, a short distance from the river, the smell of which she is persuaded affects her during the months of July and August. She has had four children in quick succession, and suckled the last seven months. She exposed herself to a chill during very hot weather, and was attacked with febrile symptoms, which increased for a week, and then obliged her to take to bed. When I saw her she had been ill fourteen days, and confined to bed the last seven. She was perfectly rational, and her countenance did not present the aspect of stupor. Her symptoms had been a very coated tongue, prostration, very high-coloured urine, loss of appetite, thirst, and frequent great flushing of the face and head in paroxysms, with succeeding perspirations. She had no splenic enlargement, nor hepatic, no decided tenderness in the ilio-cæcal region, very little diarrhœa (one day). There was a pretty copious papular eruption on her chest, the papules lowering down to spots on the abdomen, some of them resembling rose spots, but being rather larger; on the 16th this eruption had faded a good deal. She complained then of tenderness about the right upper part of the neck and just behind the right ear, there was very little swelling. On 15th, about 8 p.m., her pulse was 117, tongue red, denuded, moist, coated towards the base. On 16th, at mid-day, the pulse was 96, skin cool and soft. The bowels, which had been confined four or five days, had been opened by a water enema; the stool was lumpy. 20th.—Is gradually improving, but has considerable pain and swelling of the right parotid gland. This swelling did not suppurate, but she had a long and tedious convalescence extending over fully three months. Towards the end of her disease evening accessions of fever and most violent evening accessions of neuralgia were marked features of her state. The neuralgia was centred in the enlarged parotid gland. Both symptoms were benefited by quinine, but ultimately change of air became necessary.

Case 28.—Mrs. —, æt. 45 (?), seen October 23rd. Is a person of more than average calmness, good sense, and self-control. Has been very poorly for several days, languid and prostrate, and suffering with headache which she describes as a sensation of something pushing forward the eyeballs. She is faint also, and without appetite. The noise of the vehicles in the street, to which she has been long accustomed, now distracts her, and she is absurdly distressed at not hearing to-day from her husband who is in the country, and from whom she had a letter yesterday. Tongue coated. Bowels open. I gave her that night Morph. Muriat. gr. $\frac{1}{4}$ + Extr. Hyoscy. gr. iij in a pill which she took and slept, but awoke in 3 hours so faint that she sent for me in the middle of the night. I found her with a very feeble pulse, 66, as it had been before, and gave her stimulants freely; she rallied, and the pulse improved a little; her intellect was quite clear. The next 5 days she remained in a prostrate state with very little appetite, and incapable of her usual avocations, and confined to bed, except one day, when she was up for a few hours. Her taste was quite spoiled, she relished nothing. The bowels were pretty regular. After the first few days a well-marked lichenous itching eruption appeared on the front of both forearms, but there were no rose spots, or typhus eruption. The abdomen was fallen. Skin remained cool. Pulse 87. Tongue covered with a whity paste, with red papillæ at its tip. Several nights she was restless, and sometimes rather wandering, slept but little, except one night when she had a warm bath. The 10th day after I saw her she was so brain weak and confused that she could not tell, in trying to add up her household accounts, whether she was dealing with pence, pounds, or shillings. Pulse 66, very weak. Skin quite cool. No ilio-cæcal tenderness or gurgling. About the 17th day improvement commenced, but went on extremely slowly and gradually, so that even quite at the close of the year her head felt very feeble, and very little exertion (as a visit from friends) fatigued her. The one feature of her malady was prostration of cerebral and cardiac action without any apparent fever, though I regret that I have no thermometric evidence to offer. Some of the rooms in the house had recently been painted inside, but she had no blue line, or colic, and none of the other members of the family suffered in any way. Excluding this cause I cannot but regard her malady as essentially a fever, though lacking the usual pyrexia. It might well be called a nervous fever, from the predominant failure of cerebral power.

It must be admitted as not impossible that both these cases were *au fond* typhoid modified by some malarious or other influence. Dr. John Harley recognises "paludal enteric fever" as the common form of the disease, and thinks that there exists irresistible evidence of the direct connection between these two diseases. The malarial form of Typho-Malarial Fever is described by the American surgeons as "a continued fever which presents, also, a more or less decidedly remittent type, at the beginning at least. It is accompanied by diarrhœa and abdominal tenderness, but usually without tympanites." Its characteristic lesion is enlargement of the solitary follicles of the small intestine, and especially of the ileum; but ulceration only occurs rarely, when some of the largest present a minute point of ulceration on the apex. Peyer's patches are sometimes quite healthy, or only dotted with pigment so as to present the shaven-beard appearance. Citations made by Dr. J. Harley from Dr. Davis' work on the Walcheren fever show that very much the same lesions may occur in those dying of this malarious disease as are observed in ordinary typhoid. The agminate glands of the small intestine, according to Dr. Morehead, are affected in some cases of remittent fever. He gives 2 cases in his work (Vol. I, pp. 146, 157) in which they were enlarged and ulcerated. These statements may well lead us to think that enteric fever may sometimes be so considerably modified by malaria or allied influences as to constitute a very materially different disease from the ordinary form. They also throw much doubt on the opinion that the ordinary lesions of Peyer's patches which we are familiar with in typhoid fever constitute a distinctive characteristic of the disease. Dr. J. Harley holds that there is a simple inflammatory enteric fever, which is due to no specific cause, and which may produce lesions not distinguishable from those occurring in the epidemic malady. But, further, the last case I have related especially raises doubts in my mind whether what the older physicians termed "nervous fever" may not be a totally distinct disease from our recognised forms. Graves gives the case of a man who died of fever, not putrid, or gastro-enteric, or petechial, in whom all the viscera were found in an apparently sound condition. This could hardly have been typhus or typhoid. He mentions another case equally remarkable for its extraordinary duration (nearly 3 months) as for the total absence of anything like visceral lesion. The disease terminated in a well-marked crisis accompanied with sweating. I have recorded ('Brit. Med. Jour.,' August 3rd, 1867) a case under my own care where low fever without any eruption produced death by subsequent phthisis. The fever lasted about 2 months, and the consecutive disease as long. Several small ulcers were found in the large, but nothing in the small intestine except one very small, nearly-healed cavity close to the ilio-cæcal valve.

The view which I most incline to is that typical instances of the different kinds of fever are sufficiently distinct and easily recognised, but that intermediate instances exist whose exact nosological place it is very difficult to fix.

Refractory cases of malarious fever are sometimes met with marked by profound cachexia, enormous enlargement of the spleen, and anasarca of the extremities, which resist ordinary modes of treatment and change of air. Such cases Trousseau declares are treated with such marked success by the following method that it may be well to describe it in detail. The patient takes first an emetic and a laxative, consisting of ʒvi of Sulphate of Soda in ℥viij of Decoction of bark. The next day he takes a dose of Sydenham's electuary containing ℥i of calisaya bark. This is repeated after an interval which is gradually increased from 1 to 8 days, the same dose being always given, and usually with the addition of a little laudanum to prevent vomiting and diarrhœa. It is not intended that the whole dose of electuary should be gulped down at once, it may be taken in separate portions, say ʒi or rather less every 4 hours. The patient also takes a dose of Ammonio-citrate of iron at each meal. By this procedure Trousseau affirms we avoid causing gastralgia, and a sort of febrile state which is apt to come on when quinine or bark is given every day. Moreover the system does not become insensible to the remedy. It is to be noted, however, that the presence of intestinal worms may cause this medication to fail, the fever, however, ceasing after their expulsion.

Mr. J. Turner has found Liq. Potass. Arsenit. ʒss + Tr. Card. Co. ʒss given 2*dis horis* ad vices iv—v very effectual in fever in India. The last dose is to be taken at least 2 hours before the expected paroxysm (v. 'Med. Times and Gaz.,' Sep. 28th, 1861).

Dr. Donaldson reports very favorably of an old remedy, cobweb, which he has used successfully in intermittent, remittent, and common continued fever in India. The dose is gr. v in a pill *ter die*, or oftener. It may be given advantageously during the paroxysm as well as in the intermissions; and as the author himself testifies from personal experience quickly and gratefully relieves the almost insupportable headache and restlessness of an acute attack. In quartans and other inveterate forms of fever, which have resisted daily repeated 20 grain doses of quinine, the good effects of cobweb are most conspicuous (v. 'Madras Q. J. of Med. Sc.,' April, 1863). One would gladly try the remedy, but how is one to get ʒi of cobweb? A legion of spiders would be required to produce as much.

The following remarks of Dr. Cameron appear so important both as regards tropical disease, and cases of a similar kind occasionally occurring at home, that I am anxious to insert them.

Dr. Cameron recommends gr. v of Quinine with a purgative on admission, repeating the former twice at intervals of 2 hours in all serious-looking cases. His experience leads him to the belief that quinine is the master key to the treatment of nearly every tropical disease. Malarious dysentery he regards as in great measure essentially fever with disease of the bowels superadded, and treats it by 20 or 30 grains of quinine in 24 hours with as much ipecacuan as the stomach can be got to bear, aided by opiates, astringents, counter-irritation, and suitable nourishment. Acute capillary bronchitis which used to cause great mortality among infants and young children in the tropics is in like manner essentially fever, and its most alarming symptoms, when the tubes are stuffed with mucus, and the child half asphyxiated, will often subside with astonishing rapidity after a smart emetic, followed by repeated doses of quinine combined, if it can be done, with ipecacuan or James's powder. ('Lancet,' 1861, vol. ii, p. 456.) Recently a gentleman, æt. 55, consulted me for a violent paroxysmal, but not periodic cough, which had come on since his return from the West Indies, where he had enjoyed good health. The last few days nocturnal attacks of fever had occurred. Both ailments yielded to quinine.

The mode of administering quinine is sometimes of great importance, as the following instance, mentioned to me by Dr. Richardson, of Tunbridge Wells, shows. A man was suffering from a recurrence of malarious fever, contracted I believe in the tropics, and was taking for its cure 3 grains of quinine 3*tis horis*. Under this medication he got much worse. It was stopped, some aperient physic given, and then gr. ½ of Quinine 2*dis horis*, which succeeded perfectly. Neither ought we to forget that a few doses of calomel, as a grain each night for a week or so, *may be* essential to the cure of a refractory ague by quinine.

In concluding this subject I would ask attention to the bearing of a few facts, viz.:—(1.) It has been shown that a cause capable of producing ordinary ague may be generated in London, how, I do not say. (2) Children in London not unfrequently suffer with disorder which has the character of a remittent, or quotidian intermittent, and is cured by quinine, or quinine with iron. (3) Neuralgia affecting various situations is not uncommon, which yields to the same treatment. (4) The cause which produces influenza occasionally gives rise to inter- or re-mittent fever and neuralgia. Now as London is not a place well calculated for generating malaria in the ordinary way, and as another cause appears to be capable of producing similar phenomena, it seems to me a question that may fairly be raised whether there may not be several causes or miasms, which acting on the nervous system produce the same or similar effects. When a person free from all ague taint gets a violent facial or abdominal neuralgia which is cured by quinine in full doses, we can hardly avoid asking ourselves the question what is the difference between such disorder and that of malarious origin. If the results are so like must not the causes be like too? I think it may also be argued that it is certain that some such miasmata are very commonly and widely-diffused, and that it is but reasonable to attribute to them a large share in the generation of our ordinary maladies. The results of their action are of very various character according to the state of the recipient. Generally, however, it may be stated that their main action consists in the depression of nervous power. According to the part specially affected, the symptoms will vary, thus there may be cerebral depression, neuralgia, palsy, fever, or hyperæmia and exudation phenomena.

I may mention here that I have met in the course of the last year with two cases of quartan ague, occurring in labourers. One had contracted his ague at Deal, and had suffered with it at "spring and fall" for ten years. The other had received his taint at Tilbury, in Essex, 5 years previously. In the first the attack commenced about 1 p.m., in the second at 6 p.m. In the latter as the fever gave way, a sharp paroxysm of neuralgia of all the divisions of the left fifth nerve occurred, and lasted all night from 4 p.m. This man attended 6 weeks, and had no attacks after the first seven days, he took quin. dis. gr. ij, 2*dis horis* at first, and afterwards less frequently. The other took tr. cinchon. flav. ʒij, 4*tis horis;* he only attended eight days, but had no return after the second. These are as far as I know the only cases of quartan I have seen in the course of thirteen years. A mid-aged female at present under my care has a disorder which is apparently ague of octavan type. It has been arrested by quinine.

LEEDS SCHOOL OF MEDICINE

CHAPTER XLIX.

SECRETION FLUXES.

It has been already seen that increase of secretions is one of the results of vaso-motor nerve paralysis. The glands thus circumstanced receive more than their normal supply of blood, and secrete accordingly. Division of the sympathetic on one side of a horse's neck causes that side of the face and head to be bathed in sweat. Verneuil relates a case of neuroma of the prepuce, where the patient bounded back as if electrified when the part was gently stroked, while his face became red and covered with sweat. ('Archiv. Géner. 1861, II, p. 537. Anstie mentions the case of a boy who suffered from Epileptiform attacks, with some permanent weakness of the whole of the left side, and occasional hyperæmia, heat, and sweating of the left side of the face. The symptoms were materially aggravated by constipation. Muscular exertion produces very much the same effect, and no doubt in the same way, viz., by exhausting nervous power. Diaphoretic drugs may very reasonably be regarded as toxic agents operating especially on the vaso-motor nerves of the sweat glands. Here, then, we have a secretion flux produced by the several causes which we have so repeatedly noticed in various neuroses, viz., direct loss of nerve power, inhibitory prostration, and toxæmia; and it cannot well be doubted that the same causes will act in the same way on other glandular organs. Nerve exhaustion seems to have a special tendency to mark its presence by exaggeration of perspiration. Phthisis, rickets, simple debility, all present this symptom very strikingly; and its especial occurrence during sleep, when the nervous organs are to a great extent at rest, indicates strongly its dependence on the cessation of their controlling power.

The *salivary glands* are occasionally the seat of morbid flux, sometimes to a prodigious amount. Sir T. Watson refers to several such cases. One which he saw himself was a young girl, æt. 10, who was spitting 3 pints of saliva in 12 hours. The flux had replaced profuse acid perspirations, and may, therefore, be regarded as one of toxic origin. It was put an end to by a severe attack of influenza. Ptyalism from drugs is, of course, toxic. When it occurs in the course of pregnancy, or from dental irritation, it is to be regarded as of inhibitory origin. The same may be said when it attends on throat neuralgia. Graves records the case of a mid-aged female who, after much debilitating illness (profuse leucorrhœa and obstinate retching) was affected with a remarkable and profuse salivation amounting to more than a pint and a half per diem. This was arrested, and subsequently kept under control by the free use of opium, gr. i *4tis horis* (v. p. 471). Here the flux may have depended on simple vaso-motor paresis. Its being so decidedly checked by opium is no mean proof of the tonic virtue of that drug. In some instances related by Dr. Churchill of salivary flux during pregnancy, the quantity was extraordinary—2, 3, or 4 quarts per day. Opium was beneficial in one.

The *liver* is well known to be prone to such disorder as we are now considering. Bilious flux is a common result of heat and malaria (two eminently enfeebling influences) in tropical climates, and is by no means rare among the inhabiters of the temperate zone. Occasionally the amount of bile produced is so large that it causes well-marked jaundice, and tinges the urine deeply, as well as the stools. My first acquaintance with the above kind of disorder was in the case of an officer serving in the Crimean war, who was highly jaundiced, but passed at the same time a large amount of bile in his stools. "Lots of blue pill and calomel" were given, as well as some emetics to get rid of the bile, but it appeared to him "that he made more as fast as it was carried away." During his voyage to England the jaundice disappeared, but remittent fever came on, and increased so much that he was much more seriously ill when he reached his destination than when he embarked. When he came under my care at home he was greatly prostrated, quite unnerved, and had nocturnal paroxysms of fever, accompanied with determination of blood to the head. I interpret the phenomena in this case as, first, paresis of the nerves supplying the liver, and, subsequently, more general and severe affection of the sympathetic, with exemption of the hepatic plexus. The treatment was evidently inappropriate. The following case is one of similar character.

Case 1.—J. M—, æt. 28, male, admitted January 14th. Ill three weeks, jaundiced. Stools of a light, urine of a dark, colour. Liver rather enlarged, projecting two fingers' breadth below the ribs. Some nausea. Sense of weight over eyes. Has pain referred to lower sternal region, worse after food. Tongue coated. No thirst. Skin cool. Pulse feeble. Has earache. Feels very weak. Abdomen fallen. Hyd. chloridi gr. x statim, acidi nitro muriat. ♏v + liq. taraxaci ʒi + aq. ℥i *ter die.* 18th.—Stools of a different colour altogether after the powder. Mouth sore. Tongue coated. Urine clear, but of a deep red. Podophyllin gr. ½ + extr. colch. acet. gr. ij *o. n. s.* Pt. c̄ mist. 21st.—Not half so yellow as he was, but still markedly so. Stools of a good colour. Urine very red. Pulse very weak, soft. Pt. c̄ pil. et mist. 25th.—Urine of a deep reddish colour, evidently from bile; stools dark-coloured. Pills have acted strongly, had seven motions on 23rd, all darkish. Is still jaundiced. Perspires very much in a warm room. Pulse very weak. Appetite poor. Tongue coated. Seeing that, though there was free bile-flow into the intestine, the jaundice continued to manifest itself in the skin, eyes, and urine, and that there was evidence of considerable debility, I thought it probable that the condition was one rather of bilious flux than of biliary retention or suppression, and I prescribed accordingly. Twelve grains of quinine were given daily. In three days there was improvement, in twelve days there was scarce any trace of jaundice. The urine was clear and of a natural colour; the stools rather light-coloured. Nitric acid still detected a little play of colour when added to the urine. He was treated subsequently for another month on account of earache (neuralgia) and cough, and was discharged on March 10th, feeling as well and strong as ever he did. He had no cholagogue or aperient medicine after he began the quinine.

It is worth remarking that in the case above recorded there was debility and a neuralgia (earache) from the first, and that he was very readily affected by the single mercurial dose. These are all indications that the nervous power was below par. The patient was a rather strongly made man. I have recorded in the 'Med. Times and Gaz.,' February 7, 1863, a case in which this condition succeeded to one of inflammatory congestion. The practical value of correct pathological views is very apparent in such instances. There ought to be no difficulty in the diagnosis of such cases, the presence of a sufficiency of bile-pigment in the stools is quite distinctive. For treatment, quinine alone, or with sulphate of magnesia or soda will usually suffice. Sometimes change to a healthier locality may be requisite.

In a case of which I am cognisant, sea-sickness, or rather the commotion which precedes the vomiting, acts as a most powerful cholagogue, causing the evacuation, *per anum,* of a prodigious quantity of biliary matter. The biliary flux undoubtedly depends on prostration of nerve power.

The *kidneys* are also liable to excessive secretion, though this cannot always, and in all its forms, be referred to alteration of nervous influence. Diabetes mellitus, though capable of being produced by injuries to the encephalon, and sometimes of being cured by opium, is evidently something more than a neurosis. Azoturia and Diabetes insipidus have more claim to be regarded as disorders of this kind. I have already noticed the first; of the second I may say that I agree in the main with Dr. Roberts' opinion, that its immediate cause is an alteration of the renal capillaries disposing them to permit an increased transudation of watery fluid from the blood. I regard the Malpighian capillaries as more affected than those of the tubular plexus. They are probably in the same state as temporarily exists after an hysterical paroxysm, or a faint, when a very large amount of aqueous urine is suddenly secreted. In hysterical or hypochondriacal polyuria (v. Sydenham's case, p. 93, Vol. II, Syd. Soc.) there is good reason for regarding the emotional centres as the part of the nervous system where the change occurs which conditionates the watery flow. In permanent polyuria it is very noteworthy that the disorder has, in a tolerable number of instances, appeared to originate in traumatic lesions of the head. Fischer has collected 4 cases of polyuria without glycosuria, and 3 of polyuria with slight glycosuria. Dr. Roberts relates a case in which palpable disease of the brain existed, while the kidneys were healthy. In the following history there is quite sufficient proof that the brain was injured.

Case 2.—Mrs. E. J—, æt. 40, seen October 28th, 1868. She stated that a few days after exposure to great heat in the hayfield she felt a violent pain in the head across the forehead, and the right upper lid was swollen. At the same time great thirst came on, and copious diuresis, which continued. The pain extended or shifted to the left posterior part of head about 3 weeks ago; it often keeps her awake at night, and makes her feel at times as if she should lose her senses. During the last 10 weeks there has been complete ptoris of the left eye, which came on gradually. The sight of the left eye is nearly lost, the pupil is much dilated, and quite fixed. The sight of the right eye is rather misty, the pupil is active. Left cheek is very much flushed, much more than the right. The left posterior part of the head is tender to tapping, and looks swollen as compared with the right, the pain felt here extends to the top of head. Her lips tremble at times, and she has a feeling of numbness now and then in her face or fingers, more on the left than on the right, but there is no actual paralysis. No nausea or sickness now, but had a good deal at first. Pulse weak, small, 90, regular. The pain was greatly relieved by 6 leeches, blisters, and Potass. Iod. gr. v + Ammon. Carb. gr. iv + Dec. Cinch. ℥i *ter die,* but the other symptoms remained as before. Early in November her temperature was normal, 98·5°; her weight about the middle of the month was 91 pounds; the amount of urine varied from 96 ounces to 64 ounces, sp. gr. = 1002—1007; the total urea on one day's analysis was 197 grains, a smaller amount than normally corresponds with her weight, being little more than 2 grains per pound. She left the hospital at the end of the year in the same state. It is worth mentioning that sugar increased her thirst, and she took but little; she had no relish for starchy food, but enjoyed meat and eggs. There can be no doubt that meningitis was the primary disease in this case, that it affected the base of the brain especially, and the nerves in that region, and that it probably involved, to some extent, the posterior surface of the medulla oblongata, where it forms the fourth ventricle.

It is very probable, as Dr. Roberts suggests, that in some instances the lesion or defect is in some other part of the nervous system—the solar or renal plexus, or some part of the cord below the medulla oblongata, and above the origin of the splanchnics. Assuming the disease to be a neurosis, analogy suggests that it may depend on reflex inhibitory irritation, or on toxæmia, as well as on local injury or local functional paralysis. I am not aware, however, that such has ever been proved to be the case. The neurotic character of the malady is very much affirmed by its occasional sudden supervention, or sudden subsidence, during an intercurrent inflammation, or complete disappearance after it has lasted a long time (Roberts).

The *treatment* which seems to have been most useful in this disease is the administration of Valerian in very large doses. Trousseau cured one man completely by Extract of Valerian carried to the amount of 1 ounce per diem. In another, however, when the same dose was reached, the stomach became refractory, and the remedy had to be left off for a time. Subsequently it was resumed in much smaller doses (ʒjiss—ʒiij per diem), and produced very good effects. Restriction on the quantity of fluid drank is not beneficial, and causes great distress. Dr. Seidel records the case of a female, æt. 29, who, while treated solely by expectancy, or strengthening remedies, passed daily 6000—9000 cc. of urine sp. gr. 1003—1006, and lost weight to the amount of nearly 20 pounds. She was now galvanised by a powerful battery, the current being passed from the lumbar region to the corresponding anterior for 5 minutes at a time.

In 8 days the quantity of urine was reduced from 5957 cc. to 4600, and in 3 weeks to 2300, The daily mean during the second month of treatment was only 1904 cc. (about 63 ounces), and 3 months later the quantity had not increased. The bodily weight, however, had gained 8½ pounds. (v. 'Schmidt,' vol. 130, p. 97.)

In some cases of actual Diabetes the disorder seems to be so dependent on the state of the nervous system that it may be regarded as essentially a neurosis. Such cases have occurred to Dr. Pavy, and he found cessation from work and excitement adequate to effect a cure in one. In some cases where Opium achieves a cure, the disorder, it may be believed, is only functional. The characteristic condition of the urine in diabetes may, in all probability, depend on very various causes, some of which may be of a permanent kind, as structural lesion, others not. The treatment, of course, ought to vary according to the presumed cause. Thus, in such a case as I have recorded at p. 111 the indication would be to sustain and improve failing nerve power by stimulants; in an overworked man it would be to give rest; in a case dependent on traumatic lesion, to favour the natural processes of repair; in one produced by peripheral irritation, to remove the offending causes; and in one of toxæmic origin, to counteract or get rid of the poison. Toxæmia is as yet only an hypothetical cause of diabetes, though Prout says that a saccharine condition of the urine exists in dyspeptic and gouty individuals much oftener than is supposed; and the frequency of furuncles or carbuncles in those who become or are diabetic, also favours such a view. Andral relates a case which makes it very probable that remote irritation may be a real cause. A young lady had diabetes, complicated with chronic gastritis, which had been left out of account in the previous treatment. On the gastric disorder being removed by leeches, and tartar emetic ointment to the epigastrium, with a milk diet, the diabetes disappeared (p. 869).

LEEDS SCHOOL OF MEDICINE

CHAPTER L.

INFLAMMATIONS.

It must appear almost as if I were writing "de omnibus rebus et quibusdam aliis," when I reckon inflammations among functional nervous disorders, but I feel that the topic requires a brief notice in a treatise of this kind. All inflammations, and all stages of inflammation are not to be regarded as nerve disorders, but only those where the attendant symptoms betray evident failure of nerve power, and where on trial the action of tonic remedies proves curative. In many inflammations, especially in their earlier stages, the *tissue* of the part seems more concerned than its nerves and vessels. The hyperæmia and the exudation are exactly coterminous with the irritation; there is no widespread flushing of the affected surface, no tendency to continuous extension of the process. If a blister be applied to the skin the redness and vesication do not, as a rule, exceed the space occupied by the irritant, there is no indication that the inflammation produced follows the distribution of nerves or arteries. In scarlatina, on the contrary, the hyperæmia and the tissue lesion which it gives rise to (desquamation) are utterly diffuse. In typical instances of "Pneumonie franche," the inflammation, as Trousseau states, remains localised in the parts which it has from the first invaded, exactly as a phlegmon of the areolar tissue remains confined to its primary seat. In influenzal pneumonia the inflammation extends over the whole lung, as in a case recently under my care. Dr. Stokes notices the redness, firmness, compactness, and defined boundary of the solidified lung in fatal cases of sthenic pneumonia, and contrasts these features with the purple, friable, moist, and more diffusely inflamed condition of the lung in the asthenic disease.[1] The difference between the two kinds of inflammation is much the same as between a circumscribed phlegmon and diffuse erysipelas. Now, I believe that in the latter class of inflammations the vaso-motor nerves are especially and primarily at fault, and that their defect, or the cause of the disease, impairs simultaneously the contractility of the arteries, and the retentiveness of the capillaries. As a consequence we have (supposing a pneumonia) red and white corpuscles, with liquor sanguinis escaping into the air-cells, and blocking them up, while abnormal cell-growth takes place in the exudation to a great exent. The same changes, indeed, occur in sthenic inflammation, but their limitation to a certain area indicates that they are not primary, but dependent on a previous change taking place in the *tissue* of the part. The cells and fibres of the skin when irritated mechanically, as in rowing, *attract* blood in excessive quantity to the over-stimulated part, and effusion of liquor sanguinis takes place, sometimes stained by blood. The cause here is a local "trauma," which deranges the nutrition of the corium, and causes its cells and fibres to attract blood, and detain it unduly in the vessels. The existence of such attraction seems to me fairly inferred from the regurgitation of blood along the veins into the inflamed area, and from the great tendency of the corpuscles to stick to the walls of the vessels, which we witness in experiments on the frog's web. Hyperæmia is further increased by the original local disorder acting inhibitorily on the vasal nerves of the afferent arteries, and rendering the latter paretic and throbbing. If the inhibitory irritation extend to the whole vaso-motor system, general pyrexia is established. The one kind of inflammation may be distinguished as *nerve,* the other as *tissue* inflammation. The distinction is of practical importance, the indication in the one case is to restore tone to nerve and vessel, in the other to allay the irritation of the tissue. I need no better criterion of the difference of the two states than is afforded by the action of a poultice. This will sometimes bring out a very considerable crop of purulent vesicles, or even cause minute cutaneous abscesses in asthenic systems, *i. e.* will cause an inflammation, in others it will rapidly remove a notable inflammatory hyperæmia. Without some such view as the above how is it possible to explain such facts as the cure of copious bronchial muco-purulent secretion by liquor ferri muriatis, the cure of psoriasis and pemphigus by arsenic, and of some rheumatic inflammations by quinine, on the one hand; and the good effects of antimony in acute bronchitis, of ipecacuanha in dysentery, and colchicum in synovitis, on the other. The latter remedies are the very reverse of tonics, and there is unquestionably sound truth in the adage—"naturam morborum remedia ostendunt." Of course typical instances of nerve and tissue inflammation are not the most frequent, and practical skill is shown in discerning which predominates, and adjusting remedies accordingly. Depressants, tissue sedatives, must usually precede tonics, because the latter are apt to become irritants. Nitric acid, and tinct. ferri muriatis are excellent in the later period of bronchitis or nephritis, they would seldom be suitable at the outset. In Mr. Green's 'Compendium of Skin Diseases' cases are related where the sulphur fume bath, a stimulant remedy, was injurious at first, until bleeding and other depletion had been practised, but subsequently proved of great efficacy. I cannot but think it a most important matter to distinguish the different kinds of inflammation (as was ably done by Dr. Williams in his 'Principles of Med.'), and it rather seems to me that of late years we have been tending to retrograde in this respect.

---

[1] By these terms, sthenic and asthenic, I understand, as Dr. Stokes I doubt not did, that the one state *as compared with the other* manifested more vital energy, and not, as has been unfairly assumed, that in the sthenic disease the vital energies were greater than in *health.*

Exudation is regarded by some as the special and distinctive feature of inflammation, as that which constitutes an inflammatory disease. To me it rather seems that the preceding state of nerves, vessels, and tissues, is the essential matter, inasmuch as it determines the occurrence of the exudation. The dependence of the latter on the former is well seen in certain catarrhs where exudation is absent for several hours, while the system is at rest and recruited by food and stimulus, but recurs abundantly when the nerve power is exhausted, and the vessels relaxed by exertion and fatigue. To speak of exudation in the natural and older sense of the term is, I believe, to confess oneself altogether behind the march of the science of our day. Yet I cannot but regard the fibrinous fluid which fills a pleural cavity, and coagulates on being drawn off as such, as a direct effusion from the blood-vessels. Also the corpuscles which are found abundantly in the fibrinous coagulum are, I believe, white corpuscles of the blood, or such as are formed in intravascular clots, and escape from the vessels in the way described by Virchow and Cohnheim, *i. e.* by diapedesis.

I withdrew the other day from a pleura 102 ounces of fibrine-containing fluid, clear, and with but few corpuscles floating in it. Am I to suppose that all this was withdrawn from the blood by cell-growth, by corpuscles getting dropsical, and bursting into the serous cavity? The case was one of pleurisy, not hydrothorax. If direct exudation occurs in the serous membranes no doubt it does also in the areolæ of connective tissue. So it does, too, if I may judge from personal experience in the nasal mucous membrane. During the decline of a catarrh the nasal passages may be at one moment free from mucus, but in a few seconds a sudden profluvium may occur which certainly was not on the mucous surface previously, and, therefore, must have proceeded directly from the blood. Here, however, the liquor sanguinis undergoes some change in traversing the mucous membrane, which gives the fluid the mucous quality, its alkalinity continuing as before.

The nerve paresis which gives rise to inflammation may be direct, as when it is caused by some miasm (such as influenza); or it may be inhibitory, depending on remote irritation. This seems to have been distinctly recognised by former writers. Sir Thomas Watson, alluding to hepatitis as a common result in hot climates of exposure to a current of air even at 80°, says "Now the effect of that kind of exposure does not depend upon the actual temperature, but upon the *sensation* that is produced, and the sensation depends upon the *relative* temperature." Here we have two phenomena—an outside sensation, and an internal inflammation, and it is difficult to see any other connection between them than is afforded by the idea of inhibitory paresis. The visceral inflammations of rheumatism seem to be quite similar to ordinary inflammations, and like them when once set up have no shifting tendency. In the articular the sensory nerves seem to be as much or more implicated than the vasal, and pain is often a more prominent symptom than inflammation. Starting with a morbid impression on cutaneous nerves of some part of the body, we have the following possibilities:—(*a*) motor nerve paralysis, ex. Bell's paralysis; (*b*) motor nerve spasm, as in wry-neck; (*c*) vasal paralysis, as in many catarrhs; (*d*) neuralgic pains; (*e*) a combination of *c* and *d*, as in articular rheumatism. Of course unless the morbid impression derange the respective centres of the nerves concerned no effect is produced. This derangement is much more likely to happen when the general health is impaired by excessive heat, suckling, dyspepsia, &c., or when any toxæmia exists, and thus explains the relation that has been observed between such states and rheumatism. The former are general predisposing causes, damp cold or a chill is the special exciting, while the weak part of the nervous system, together with the "locus" of the peripheral morbid impression, are the factors which determine the special seat and phenomena of the disease. Something also depends, no doubt, on the kind of morbid change produced in the nervous centre. Thus a change conditionating hyperæsthesia or pain, may require very different treatment from that which produces vasal paralysis.

The following are examples of inhibitory inflammation:

Mr. Tyrrell relates the following history:[1]—"I was requested to see a young gentleman, æt. 13, who had been suffering for many days from headache of severe kind, giddiness, flushed state of countenance, and great restlessness and irritability; he was also intolerant of light, and his vision was very imperfect, being obscured by a gauze or web. I found the pulse rapid, small, but very compressible; the skin dry and hot; and the tongue loaded on the median part by a thick light brown deposit, the edges being unusually red; the appearance of this organ induced me to direct my inquiries into the state of the secretions from the alimentary canal, and to examine the abdomen; I then learnt that the patient had been freely purged, principally by saline medicines; but that the remedies had been directed to the head, under the supposition that it was the seat of the morbid action; my examination of the abdomen discovered an irregular, indurated swelling in the right iliac region, which I considered to result from a collection of hardened fæces in the caput coli. A full dose of scammony and calomel was administered, and produced a very copious discharge of hard scybala; the relief was immediate; all urgent symptoms subsided, and after a second dose he became convalescent—proving that all disturbance, cerebral, ocular, or other, emanated from the accumulation of scybala in the colon." Tyrrell adds that such cases are rare in adults, but frequent in children or young persons. Mackenzie[2] relates the case of a girl, æt. 7, whose vision became dim after an attack of inflammation of the eyes, attended with headache, when suddenly her pupils became widely dilated and immovable. The abdomen was much swollen. About a month previously to this she had passed a lumbricus. After repeated doses of castor oil and turpentine she passed at different times nine lumbrici, and vomited two; after which the belly became soft, the pupils contracted when the eyes were exposed to the light, and in the course of a few months' treatment vision was restored. Dr. Burgess[3] gives the history of a coloured man, æt. 39, who suddenly began to suffer severe pain through the right eye, and over the right side of the face and head, and about this time discovered that he had paralysis of the right side of the face. The pain continuing most severe through the globe of the right eye he soon began to experience a cloudiness of vision. For the first few days all objects viewed with the right eye alone seemed of a bright yellow colour; at the end of five or six weeks the power of vision was entirely obscured. Now began a similar set of symptoms in the left eye, resulting finally in total loss of sight in this eye also. This condition was reached in about four months after the first attack. Two months later the eyes had a staring vacant aspect, the globes being prominent, as if pushed forwards, the pupils largely dilated, and but little sensitive to light. No evidences of disease in the external coats of the eye; the deeper portions presented a greenish colour. Paralysis of the muscles of the right side of the face, with partial paralysis of the tongue, still existed; and pain similar in character, though much less severe than that which had ushered in the disease, still continued. He also described a sensation as of something crawling about on the top of his brain. He had chancre four years before, but had never suffered from any consecutive symptoms. Shortly after this he was delivered from a tænia nineteen feet long by means of pumpkin seeds and castor oil and turpentine. Two or three days after this he began to distinguish shadowy outlines of objects around him, and from this time the haze cleared away so rapidly that in a week more he was able to recognise his acquaintances. At this time the power of vision was returning only to the right eye, but soon after the left improved also. At the end of thirty days the patient could read newspapers, the pain had nearly disappeared, and both eyes had a perfectly normal appearance, save the glaucomatous hue of the inner chambers, which still existed. Paralysis continued, but was less evident. Two years and a half later the patient's sight still remained unimpaired or nearly so, and the paralytic effects had all disappeared.

---

[1] Vol. ii, p. 280.

[2] 'On Dis. of the Eyes,' p. 1061.

[3] 'Brit. Med. Journ.,' June 14th, 1862.

REMARKS.—In the first of these cases there were signs of cerebral congestion, of retinitis, and general pyrexia; in the second there was headache, paralysis of the ciliary nerves, and ophthalmia; in the third pain in the head and face, paralysis of the facial and hypoglossal nerves, and retinitis, leading to amaurosis. In all the phenomena were evidently dependent on remote irritation. The natural reading of the phenomena seems to me to be—in the first, paralysis of the vaso-motor nerves of the retinal, facial, and cerebral arteries; in the second, cerebral neuralgia, and an inhibitory palsy of the ciliary branches furnished by the third pair and of the vaso-motor nerves of the eyes; in the third, similar but more extensive neuralgia and palsy, the latter involving also both retinal vaso-motor nerves. If any one should contend that the condition in the first case was not one of vaso-motor nerve paralysis, but of direct cerebral and retinal irritation, which I can hardly think is possible, this will not apply to the second case where there was paralysis of ciliary nerves along with the ophthalmia, and still less to the third where there was palsy of the right facial and hypoglossal, together with retinitis. If the retinæ were directly irritated the origins of these nerves should have been so too, and there should have occurred contraction rather than paralysis. In the cases quoted from Scanzoni at

p. 738, it seems impossible to believe that the cutaneous hyperæmia was the result of *attraction* of blood to the skin excited by reflex irritation. It would be as reasonable to regard blushing as the result of cutaneous irritation. Tissue irritation, as when produced by a mustard poultice, is always attended with more permanent phenomena than those resulting from arterial dilatation. The diffuse character of the inhibitory vaso-motor paralysis is very apparent in the first case, and it is worth observing that both eyes were affected in all the three. If spasm of the vessels in the centres had been the cause of the palsy in the third case, should not the retinal vessels have been in a similar condition? Dr. Brown-Séquard asserts that an inflammation cannot be explained by an hyperæmia from vaso-motor nerve paralysis, but, as I have before stated, my own experience quite coincides with Bernard's, that in weakly or sickly animals actual inflammation may be produced by division of the sympathetic. This conclusion seems to me quite borne out by the evidence of the above cases.

I doubt if anything has been written more thoroughly to the purpose respecting the treatment of the various kinds of inflammation than the reader will find in some papers by Dr. P. M. Latham. ('B. M. J.,' June 28, 1862; Jan. 24, 1863.) What he calls the inflammation of strength and the inflammation of weakness are much the same as what I call tissue, and nerve inflammation. He had no doubt, nor have I, that some inflammations may be cured by V.S. and depressants, while others require a free use of stimulants and tonics.

Arterial spasm sometimes proves a chief cause of inflammation by favouring the accumulation of blood in the capillaries, and impairing the vitality of the tissues. Chilblains afford a good example of what we may term venous inflammations, the evident congestion resulting from cold being dissipated by means which promote free arterial blood-flow.

LEEDS SCHOOL OF MEDICINE

CHAPTER LI.

REMEDIES.

Some remarks on the action of the chief remedies employed in the diseases we have considered may be of advantage.

Quinine asserts its especial influence as a nervine by its power of controlling and curing neuralgia, not only malarious, but also when produced by influenza or mere debility. This proves that it has a special relation to the nervous system. Its power over malarious fever is explicable on the same view, it checks and arrests the paroxysms by virtue of its toning influence on the cerebro-spinal and sympathetic systems. That it is no antidote in the sense of chemically neutralizing the malarious poison is quite certain, as it may be given to any amount in cases of visceral disease from this cause without the least curative effect, and as it often quite fails to eradicate the morbid influence from the system, as shown by the return of the disorder at spring and autumn, or after exposure to trivial exciting causes, although the individual has long removed from a malarious locality. The peculiar effects which quinine produces when given in full doses, as buzzing in the ears, deafness, blindness, weakening of the pulse, can all be accounted for either on the view that it tones and excites vaso-motor nerves to such a degree that the arteries of the ears, eyes, and heart become contracted, and the parts they supply anæmic, or that the nerves concerned are paralysed by over-stimulation. The latter is the one I prefer. Its over-action in this way may be decidedly injurious. In one case it caused a distressing constriction of the throat, and in another a sense of fear about the heart. That the remedy is not merely an anti-periodic, as some call it, seems to me abundantly proved. There can be no question that it does actually increase and invigorate the general nerve-power when given judiciously, both restoring it when depressed by debilitating disease and enabling it as a prophylactic to resist morbid influences. The protecting power of quinine in preserving men in health who are exposed to malaria has been sufficiently demonstrated. The inference from all this is that quinine is likely to prove useful in all cases where nerve-power is much debilitated, more especially when the vaso-motor system is specially at fault, and where in consequence fevers, congestions, or asthenic effusions take place. Thus, in pneumonia of a low type, where the lungs are gorged with blood, in asthenic rheumatic fever, in some cases of typhoid and typhus fever, in chronic relaxation of the uterus, attended with menorrhagia and leucorrhœa, in bronchorrhœa, and in a multitude of analogous conditions where vascular atony is marked, quinine may be given with the distinct view of toning and contracting the minute arteries and so arresting hyperæmia and exudation, while at the same time it elevates the power of the cerebro-spinal system. Its use in various states of debility is in a measure limited by its tendency, already mentioned, to cause contraction of arteries to an undue extent, so that the functional energy of the heart and other important organs may be notably impaired from defective supply of blood. This, however, is most to be feared when there exists considerable hyperæsthesia. Like all remedies of this class quinine has the disadvantage of being liable to act as an irritant to the various tissues, so that in inflammatory disorders it is often a matter of great doubt whether it can be employed without risk of doing harm. Much, however, may be done in many instances to obtain toleration of the remedy, either by giving it in small doses or by exhibiting it in combination with some modifying agent. Thus Dr. Morehead[1] finds the administration of quinine, together with small doses of antimony, to produce excellent results in pneumonia, both primary and attendant upon malarious fever. It also acts very well in certain cases when given along with a small quantity of calomel or blue pill. It is by no means necessary that the tongue should be clean before quinine is exhibited, but it is always desirable, often essential, that there should be no visceral congestion. Great mischief may be done by pushing quinine without giving heed to this precaution. For subcutaneous injection the following formula is employed by Sequin—Quin. Dis. gr. 60 + Acid. Sulph. dil. ♏40 + Aq. Destill. ℥j, dissolve and filter carefully. Of this ♏35 = 4 grains of quinine. One grain administered subcutaneously is equivalent to 4 grains by the mouth. Dr. Waller advocates the administration of quinine in large doses in severe cases of heat-stroke, either hypodermically or by the mouth. In the latter way he gives gr. xx at once, and subsequently gr. x every hour until speech or consciousness returns. He reports 31 cases, all of which recovered except 3, in which a different treatment was pursued (v. 'Indian Med. Gaz.,' July 1st, 1869).

---

[1] 'Dis. of India,' vol. ii, p. 370.

Arsenic is in many respects a similar remedy to quinine, and has besides some peculiar actions of its own, which are significant of its general *modus operandi.* It stands next to quinine in its power of controlling malarious fever and neuralgia. It has a very marked efficacy in preventing the recurrence of menorrhagia, more so indeed than any other remedy with which I am acquainted. It arrests the exudation of eczema, impetigo, and pemphigus, when these eruptions are not of an acute and sthenic character, *i. e.* where the tissues are not very easily irritated. If the reverse is the case arsenic will surely aggravate the disorder. It has a considerable effect in stilling the jactitations of chorea, and acts in a somewhat similar way in diminishing the tendency to recurrence of asthmatic bronchial spasm. Mr. Hunt mentions that small doses of arsenic are of eminent utility in checking chronic diarrhœa or gastric irritation, although the opposite effect is apt to ensue when the medicine is given under different conditions. Mr. Spender mentions a very confirmative instance (v. 'Brit. Med. Journ.,' Jan. 16th, 1864). The following is to the same effect. A healthy female, æt. 25, while suckling, took by mistake two ℳ xxx doses of Fowler's solution, in consequence of which her breasts became perfectly dry. After the medicine was omitted the milk returned abundantly. The same seems to hold good of its action in conjunctivitis. Here we cannot but observe a remarkable agreement between its action on the internal and external tegument. The reading of these various facts seems tolerably easy; it seems clear enough that arsenic given either in too large doses, or in irritable conditions of the system, acts as a *tissue* irritant, inflaming the skin and mucous membranes, and perhaps other parts. On the other hand, it is evidently a nervine tonic, acting on both departments of the nervous system, increasing their vital power, and enabling them to resist morbific influences. Its action on the vaso-motor nerves, especially those of the cutaneous and uterine vessels, is very marked, effecting the contraction of the arteries supplying these parts, so that hyperæmia is diminished and serous and sanguineous discharges are arrested. The French commission report that arsenic is a most powerful febrifuge, and has unquestionably the property of reducing engorgements of the spleen. This latter action (like the former) must surely be ascribed to its tonic influence on the nerves of the splenic artery, in consequence of which the undue supply of blood to that organ will be reduced to more nearly its normal amount. The curative action of arsenic in chorea and asthma may be explained in a like way by regarding it as a tonic of nerves or nervous centres which are weak, unduly excitable, and mobile. In chorea the cerebro-spinal, in asthma the vagi, nerves feel its beneficial influence. Schmidt and Stürzwage[1] have determined that small doses of arsenious acid produce a considerable diminution of metamorphosis (20 to 40 per cent.). Both the urea and the pulmonary CO_2 were lessened, and corresponding quantities of fat and albumen were retained in the body. I think it will be admitted that the above exposition of the *modus operandi* of arsenic is at least consistent with itself, and that the original assumption explains naturally all the therapeutical facts with which we have become acquainted empirically. It has the advantage of doing away, as in the case of quinine, with any notion as to the *specific* action of the remedy, and of reducing the various phenomena under an intelligible and rational principle. The chief difference between quinine and arsenic seems to lie in this, that the latter is much more of a tissue irritant than the former, and has more special localities for its operation. Dr. Hughlings Jackson has suggested to me that the therapeutic virtue of arsenic may depend on its replacing phosphorus, or some other isomorphous constituent of nervous tissue which has come to be deficient. This is not at all improbable, and at any rate there can be no doubt that arsenic improves the nutrition of the nervous system. In the administration of arsenic much may be done to adapt the remedy to the special state of the system. Thus, it may be given with a saline when there is a tendency to inflammatory excitement, or with tr. cinchonæ when depression and weakness of circulation are prominent features. The addition of a little opium is a useful guard to obviate intestinal irritation, and should generally be made when it is requisite to give rather large doses, as is the case in ecz. figuratum, in malarious fever,[2] and some instances of sciatica.

---

[1] 'Parkes on the Urine,' p. xxiii.

[2] v. Chapple, 'Med. Times and Gaz.,' March 2nd, 1861. Almés, 'Gaz. de Paris,' xxii, 1860.

Iron requires merely a brief mention as a nervine tonic. The saccharated carbonate, and citrate of quinine and iron are the most useful forms. I have tried the corresponding hypophosphite but it does not seem to have any advantage. In cases where the urine is acid and lateritious with accompanying fever and prostration, and where it is doubtful whether quinine alone will be borne well, it often answers to give citrate of quinine and iron with citric acid and bicarbonate of potash, so as to combine the tonic with an effervescing saline, to which also a few drops of hydrocyanic acid may be added. The recent investigations of Pokrowsky[1] show distinctly the chief effect of iron to be manifested in improved nutrition, the animal temperature being raised, the urea secretion augmented, and the weight of the body increased. He states that all preparations of iron act alike. I should qualify this by adding *if they are equally well digested by the stomach.* M. Cordier[2] has recently adduced evidence to show that lactate of iron interferes less with digestion than any other chalybeate, even than "fer réduit." This might be important to remember in dealing with great anæmia associated with irritability of the stomach, where the ordinary preparations of iron cannot be tolerated. Liq. ferri perchloridi I have lately found very useful in asthenic forms of pneumonia and pleurisy. I give it in ♏20 or ♏30 doses *2dis vel 3tiis horis.* Dr. Reynolds finds it valuable in rheumatic fever, and its virtue in Erysipelas, Diphtheria, and Scarlatinal nephritis has been long known. In fact, it is appropriate to very much the same conditions as quinine is.

Strychnia is a nervine tonic which addresses itself specially to the motor-nervous apparatus of the cerebro-spinal system. It finds its opportunity in all cases where the nerve-cells of the centres are weak, and cannot furnish the requisite stimulus to the motor nerves, whereas it is injurious in all conditions of an opposite kind. It is not usually considered to have any action on the brain, but some very positive evidence has convinced me that it affects the superior as well as the spinal centres, arousing and increasing their nervous energy when it is defective. On the sympathetic system it acts much less evidently. Dr. H. Vernon[3] has, however, shown that it powerfully stimulates the developed uterus to contraction in states of inertia, and its power of arresting

---

Virchow's 'Archiv,' xxii, 5, 6; 1861.

[2] 'Edin. Med. Journ.,' 1863.

[3] 'Brit. Med. Journ.,' Dec. 1857.

vomiting in certain cases of irritability of the stomach is certainly very striking. It is occasionally serviceable in torpor of the bowels as an addition to purgatives, and I have seen it remove very formidable symptoms of intestinal obstruction. Thalwitzer[1] has found it an effectual remedy in both tertian and quartan ague, preventing relapses much more certainly than quinine. It should invariably be administered in solution and not in the form of pill. Given in this way it is most perfectly safe, and there is not the least risk of its producing the so-called cumulative effects. I have given it very largely for many years and have never observed anything of the kind. Dr. Fleming's explanation of apparent cumulative action is I have no doubt correct.[2] He considers that a number of pills remain for a time undissolved in the alimentary canal, till some change suddenly occurs, when they all liquefy and are absorbed at once. The view adopted by some that the action of strychnia depends on its lessening the capacity of blood for the absorption of oxygen I must consider erroneous, as I cannot think that the tonic and energising influence of the drug can be explained by the mere diminution of the arterial character of the blood. That strychnia so affects the blood may be very true, but I hold it to be a mere "neben-werk" of its action, and in no way essential to its therapeutic efficacy. Semi-cyanosis of the blood by other means does not increase nervous energy.

Digitalis has long been employed and ranked as a depressant agent, and that it may be used as such very effectively there is no doubt. Latterly, however, various observers have satisfied themselves that it may under certain circumstances produce diametrically opposite effects, acting in fact as a powerful cardiac toner or stimulator. I stated my belief of this in 1859, v. 'Brit. Med. Journ.,' Dec. 17th, and since then evidence has accumulated considerably proving that such is the case. Winogradoff and Traube show by exact experiment that digitalis if not given in excess does not diminish, but (according to Traube) actually increases the pressure in the arteries. The latter states that digitalis acts both on the regulating and motor nerves of the heart (the vagi and sympathetic cardiac nerves), and that the degree of pressure in the aortic system is the conjoint result of these two factors. The first action of digitalis on each is to excite, and the second to paralyse. If then the motor are more stimulated than the regulating nerves, the arterial pressure will be increased, and so it will be if the regulating are enfeebled while the motor are excited. On the contrary the arterial pressure diminishes when the regulating nerves are more strongly excited than the motor. In a dog after division of the vagi the pressure rose after injection of digitalis from 124 to 260, declining in ten minutes to 176 millim. Repetition of the injection speedily arrested the heart's action. There seems to be a remarkable correspondence between these observations and those of Hufschmidt and Moleschott as to the effect of irritation of the medulla oblongata and spinal cord on the frequency of the pulse, v. p. 10. In addition to the results quoted there, it may be mentioned, that they found that irritation of the *medulla oblongata* was conducted to the heart through the pneumogastric, and not through the sympathetic nerves, while irritation of the spinal cord was transmitted to the heart through both sets of nerves. From the above evidence there seems good ground to conclude (1) that digitalis in the milder degrees of its action has a stimulating influence upon the heart, acting through the medulla oblongata and spinal cord or the cardiac nerves proceeding from them; (2) that its stronger action has the reverse effect, like galvanism or mechanical irritation, arresting the heart's movements. How this arrest is produced is not clear. On the one hand it may be supposed that the over stimulus tetanises the heart, producing such strong contraction that the ventricles no longer relax to admit blood, which of course would bring the circulation to a standstill. This view is supported by the fact that, according to Dr. Fuller's observations and my own, the heart after death from digitalis is found with its cavities firmly contracted, contrasting remarkably with the condition produced by aconite and chloroform. On the other hand the arrest may be regarded as the result of inhibitory action, the excessive stimulus producing a morbid and depressing effect. This view is on the whole I think the most probable, as we are frequently meeting with analogous instances where it appears that an unnatural or unsuitable stimulation tends to paralyse nervous power. Besides the amount of stimulus the degree of excitability of the cardiac nervous and motor apparatus is a highly important factor of the ultimate result. This is demonstrated by the following quotation from Mr. Lister's most valuable paper:—"In a healthy state of the nervous system very gentle irritation of the vagus increases the heart's action, while a slightly stronger application diminishes the frequency and force of its contractions. . . . When partial exhaustion has occurred a much stronger galvanic stimulus is required to produce the same effect upon the heart than at the commencement of an experiment; and thus an action of the battery which when first applied causes marked diminution in the number of beats, may after a while come to have the opposite effect, and increase the heart's action as decidedly as it had previously lowered it: while at an intermediate period it may seem to have no influence at all." Just in the same way, I conceive, digitalis tones and strengthens the action of a feeble heart, but lowers that of a vigorous one.

---

[1] 'Preuss. Militar. Arztl. Ztg.,' 1862.

[2] 'Edin. Med. Journ.,' Dec. 1862.

Clinical observation in various particulars confirms the above views. Thus there is some evidence that digitalis acts in a like way upon the vessels as upon the heart. It is said to check epistaxis, and Dr. Brinton affirms it to be the best remedy for hæmorrhage from pulmonary cavities in doses of ♏30 to 90 *6tis vel 4tis horis.* In the case of menorrhagia it is considered to act on the uterine tissue rather than on the vessels, but this seems to me problematical, seeing that the muscular fibres in the unimpregnated state are undeveloped. However this be it is certain that it produces contraction of contractile tissue. Digitalis is spoken of highly by some observers for its efficacy in neuralgia. Mr. Hardwicke[1] has always used it in 'tic douloureux,' with the happiest results, giving gr. ½ of the powder every three hours even in cases where he much feared its depressing effects on account of the great debility. M. Serre[2] reports the cure of several long-standing cases of hemicrania, including his own of fifteen years' duration, by means of Debout's pills, consisting of quin. gr. iss + pulv. digitalis gr. ⅘ in each, one taken every night for three months. The quantity of quinine is too small to produce any material effect. Boison says[3] that a pill of musk gr. i + extr. digitalis gr. iss + opii gr. ½ has a magical effect upon neuralgia. There can be no doubt that the drug acts in such instances in the way of a tonic, probably much like the quinine with which it is associated, and which has in large doses a like power of slowing the heart's action. If further observation establish the advantage of giving large doses of digitalis in asthenic cases of delirium tremens, it will be an additional evidence in favour of the primary tonic action of the remedy, and will accord with what we have just seen of its curative influence in neuralgia. Dr. Wilks[1] has performed a most interesting crucial experiment which absolutely proves that digitalis may revive and restore the failing action of the heart, and therefore cannot possibly be a mere depressant. The patient was a woman, who having long suffered from disease of the heart had a severe flooding after labour. She was apparently in *articulo mortis,* her limbs were cold, face livid, no pulse at the wrist, and a mere fluttering to be heard when the ear was applied to the region of the heart. The body was covered with a deathly clammy sweat. Brandy and ether had failed, but ʒss doses of tr. digitalis, *o. hora,* restored her after seven had been given, and she recovered. I had for some time intended to use the same means if a fitting opportunity occurred, and had spoken of the same to several of my friends as a possible succour *in extremis.* Two cases which I recorded, v. 'Med. T. and Gaz.,' Dec. 13th, 1862, of the tonic and restorative action of digitalis in debilitating disease of the heart are worth referring to by any one who has doubts on the matter. So is one I have related in 'Clin. Soc. Trans.,' 1868, p. 148, where a patient who was pulseless and to all appearance moribund, regained a distinct radial pulse, and lived over a week by the aid of this drug. She died suddenly 41 hours after its omission. I believe, however, that the drug does not agree well with all individuals, any more than any other drug does. It may affect in some the regulating much more than the motor nerves, and this may render it occasionally altogether improper for administration. The diuretic power of digitalis is not unfrequently very evident, but it partakes of the family infirmity belonging to all its congeners, that it is very uncertain. Dr. Christison[2] is inclined to believe that its two actions, the diuretic and sedative are incompatible. I think this is very likely, and further that in any case where it acted principally on the heart as a toner or as a sedative its renal action would be less developed. Dr. Christison speaks very decidedly as to the non-increase of renal irritation in the cases where he has administered it for the relief of the dropsy of Bright's disease.

---

[1] 'Assoc. Med. Journ.,' June 1, 1855.

[2] 'Bull. de Thérap.,' April 15, 1861.

[3] 'Bullet. de la Soc. de Méd. de Gent.,' May and June, 1861.

Tannin may be taken as a representative of the class of astringents. Its action on nervous tissue is not very apparent, but that it affects the smaller vessels and capillaries is tolerably certain. It probably renders their membrane more firm and resistent, and therefore less distensable by the blood, and permeable by exudation. It finds its opportunity in asthenic forms of inflammation and congestion, where it reduces the hyperæmia by contracting the vessels, shrinking up and obliterating those which have been morbidly developed. In a case of inveterately relapsing corneitis of both eyes producing very great impairment of sight, I ultimately obtained complete recovery by giving gr. xxx of tannin *ter die*. I think it is quite possible that the nervous tissue may be affected by the astringent in an analogous way to the vascular, rendered less mobile and excitable. The beneficial effect of alum in lead colic, which can hardly depend on removal of the lead from the system, points to some influence of this kind. In any condition where nervous disorder might be increased or maintained by hyperæmia, tannin would probably be useful. On this ground its utility may be explained in some cases of epilepsy. Its chief advantage in such and in similar disorders depends on its having less tendency to cause irritation than most other tonics.

---

[1] 'Med. Times and Gaz.,' Jan. 16th, 1864.

[2] 'Edin. Monthly Journ. of Med.,' Jan., 1855.

Sulphuric and Nitric Acids have certainly some claim to be regarded as toners of vaso-motor nerves. They cannot be supposed, of course, to act in their original form on the parts they influence, as their acid quality must be lost the moment they enter the circulation. They cannot be mere astringents like tannin. When sulphuric acid restrains a choleraic purging, or a colliquative sweating, these effects must surely be produced through the nerves that regulate the arteries of the internal and the external teguments. Its special nervine action is attested by the following quotation from Dr. Pereira:[1] "No remedy is so successful in relieving the distressing itching, formication, and tingling of the skin, as diluted sulphuric acid taken internally." Nitric acid is certainly a remedy of considerable efficacy in catarrhal affections, both of the bronchi and intestines, and it has, further, this special indication of its nervine operation, that it is often very serviceable in the spasmodic period of pertussis. To those who are impressed like myself with the great concernment of the nervous system in all cases of malarial fever, it will not be without significance that nitric acid has been found a valuable remedy in these disorders, in some cases surpassing quinine.[2] It is very useful, also, in enlarged spleen. A writer in the 'Dublin Journ. of Med. Sc.,' May, 1865, p. 419, says that he has found nitric acid of the very greatest benefit in cases of nervous exhaustion. He employs it frequently, and in very large doses, and the results he has obtained have often surprised him, "it seemed as if it acted like a direct nerve food, its action was so decided and immediate."

---

[1] 'Mat. Med.,' vol. i, p. 472.

[2] 'American Journ. of Med. Science,' April, 1861, January, 1860.

Opium is a drug, the empirical use of which very far outruns our scientific knowledge of its action. Molière's quiz at physicians on this score is almost as appropriate now as at the time he wrote. There can, I think, be scarcely a more glaring instance of the necessity which exists for careful research into the *modus operandi* of remedies. Taking our common experience of the effects of opium, we know that it acts as a soporific, as a calmer of pain, and as an arrester of intestinal and other secretions, and morbid profluvia, even of some hæmorrhages. Graves gives a case in which obstinate bleeding from the gums was arrested by opium (v. 'Clin Med.,' p. 272). Stewart relates some cases in which opium was given in very large doses to females who were syncopic and almost dying from uterine hæmorrhage with very great advantage (v. 'Med.-Chir. Trans.,' vol. iv, p. 366). Further, we know that in certain constitutions it has a stimulating influence on the brain, manifested both in greater activity of the intellectual functions, and in a greater capacity of enduring fatigue. This stimulating effect, when excessive, may be succeeded by depression and sopor. In some inflammatory diseases, as in sclerotitis and in peritonitis, opium decidedly checks and subdues the hyperæmia and tendency to exudation. The action of the drug on the cutaneous nerves seems to be rather uncertain, it does not seem by any means to cause diaphoresis frequently. Nay, even Dover's powder I have found, in accordance with Descamp's[1] recommendation, materially to check the night sweats of phthisis. Occasionally it produces a decided diuretic effect; I have seen it raise the daily amount of urine from 20 or 30 ounces to 50 or 60 for a time. The reading of these various facts is sufficiently obscure; it is not easy to refer them to any one general principle.

It might be imagined that opium acted on other tissues in an analogous way to that in which it affects the nervous, rendering them, as it were, torpid and disinclined, or inapt to function. This would explain the arrest of secretions, and perhaps of exudations, and of inflammations, but leaves quite unaccounted for, or rather is contradicted by, the stimulant action of opium on the brain, its power of preventing fatigue, and of arresting hæmorrhages. Two things are most necessary to be regarded in speculating on the *modus operandi* of opium, viz., the amount of the dose, and the individual idiosyncrasy, or the state of the nervous power. According as these vary its effects vary extremely. It appears that the larger the dose, *cæteris paribus*, the more speedily and decidedly sopor ensues, while small doses are more apt to cause excitement. Small doses also are quite adequate to control diarrhœal exudations, and to "lock up" secretions. It may be supposed, it appears to me with much probability, that the apparently different actions of opium depend very much on the circumstance whether it acts chiefly on the cerebro-spinal or sympathetic systems, a difference which may reasonably be ascribed to original diversities of constitution. The chief action of opium in moderate doses is that of a stimulant or toner to nervous tissues, but in the majority of individuals it acts more on the sympathetic than on the cerebro-spinal system. By stimulating the vaso-motor nerves it produces contraction of arteries, and thus lessens the flow of blood to various parts. Hence the skin of the face and head in opium narcosis becomes pale and cool, while the brain, more or less deprived of blood, lapses into sopor. Hence also hyperæmias, hæmorrhages, and morbid exudations are arrested, and even natural secretions restrained. These instances seem to me almost conclusive. If opium did not contract arteries, how could it arrest a uterine hæmorrhage? Dr. Wilks writes ('Practitioner,' 1868, December, p. 332), "In the same sense (of constringing the vessels) I should say that opium is the most important anti-inflammatory remedy at present known." He mentions the case of a child suffering from bronchitis, and of another from croup, who both had a narrow escape of dying from an overdose of opium, but recovered from the effects of the medicine and of the disease at the same time.

---

[1] 'Gaz. Méd. de Lyons,' January, 1861.

Mr. White Cooper has proved that a weak solution of Opium (Extract. Opii gr. j ad. aq. ℥j) has a most beneficial effect in many cases of conjunctivitis. He has seen instances in which the inflammation yielded to this, having resisted every other application. Dr. Fleming, in his excellent lecture on the treatment of Opium eating (v. 'Brit. Med. Jour.,' 1868, February 15), states that on the complete withdrawal of the drug, the bowels, formerly confined, become much relaxed, and a state of diarrhœa is established, while sweat pours from the cutaneous surface. The same result of diarrhœa has been observed in China on the discontinuance of Opium-smoking (v. 'Med. Times and Gaz.,' 1861, March 23).

The calming of pain by the local application of opium, as in subcutaneous injection, may be explained according to the view I adopt, if we bear in mind what has been advanced as to the essential character of neuralgic pain, for the relief of which opium is most efficacious. The suffering nerves, being in a state of vital debility, are restored to a healthier state by the action of a stimulant. I have seen the subcutaneous injection of morphia produce immediately a good-sized patch of redness, with two or three red elevations like longish wheals. Mr. Simon says, "Opium is not an anæsthetic, except by the production of stupor." The mental excitement and the prevention of fatigue may be accounted for by its exerting a stimulant action on the brain and spinal cord. It is this action which renders it often so inappropriate in Delirium Tremens.

The chief objection to the above view is that opium, if it acts specially on vaso-motor sypathetic nerves, ought to dilate rather than contract the pupil. The radiating fibres of the iris, which are made to contract by galvanizing the cervical sympathetic, ought to be similarly affected when opium is administered. It is very possible that this would be the case did not the motor nerves of the circular fibres pass through, and probably receive additional fibres in the lenticular ganglion. This nervous centre must be regarded as belonging to the sympathetic, and, consequently, the nerves proceeding from it will be affected by opium in the same way as other sympathetic nerves are. The pupil is therefore contracted. Unless it be admitted that the grey matter of the ciliary ganglion influences the nerves which proceed from it, it is not easy to imagine what can be its purpose. If the action of opium could be limited, like galvanism, to the sympathetic filament proceeding to the nasal or to the lenticular ganglion, it might produce dilatation. As it is, however, the far more powerful and muscular nervous apparatus which effects the closure of the pupil overrules the other. A case recorded by Dr. Baly in his translation of 'Müller's Physiology,' vol. i. p. 828, may be noticed here. The third nerve of one eye was paralysed, the pupil was slightly dilated and perfectly fixed, the strongest light causing no contraction, although the vision was perfect. The adjusting power of the eye was lost or much impaired. Now, in this case the pupil was not much dilated, because the grey matter of the lenticular ganglion still kept up an influence on the motor nerves, but the iris could not be influenced through the retina, because the communication of the ganglion with the third nerve was interrupted. Belladonna, on the other hand, dilated the pupil further by paralysing the ciliary ganglion. There is no doubt that the optic and the third nerve constitute the nervous apparatus essential to the main movements of the iris, and the dilatation can be accounted for under ordinary circumstances simply by the unopposed action of the straight fibres, some of which may be merely elastic tissue. The sympathetic fibres are probably, as in other situations, chiefly distributed to vessels, and take no important part in the movements of this muscular curtain. Clearly full dilatation of the pupil occurs under circumstances which seem to exclude all stimulation of any nerve, as in chloroform narcosis, and fatal syncope.

A second objection which may be made is that copious sweating occasionally occurs in opium poisoning, and even from moderate doses of the drug. This looks more like relaxation of vessels than contraction. To this it may be replied that copious sweating is a common result of any cause which powerfully depresses the nervous system; it occurs in apoplexy, in profound debility of malarious origin, and in sudden embolism of the pulmonary artery. It may, therefore, well occur in fatal opium narcosis, where the brain is paralysed for lack of arterial blood. As to the diaphoretic action of ordinary doses, it may be explained on the following grounds. All glands, as Bernard shows, have their motor nerves, stimulation of which excites them to active function. Now retaining the view that the primary action of opium is stimulant, it is quite conceivable that in some parts it may stimulate the gland-motor more than the vaso-motor nerves, and thus promote instead of suppressing secretion. Individual peculiarity is probably largely concerned here; thus cats are, I believe, invariably profusely salivated by a dose of opium, while I scarcely have ever heard of such an occurrence in man except the case mentioned by Pereira.[1] A third objection may be raised from the circumstance that opium produces in some persons an increased flow of urine, as especially observed by Dr. Woodward.[2] I have several times observed this, but have generally seen that the secretion was pale and aqueous just like hysterical urine. It is very difficult to say what condition of vessels co-exists with this kind of renal secretion, but I doubt very much whether it is one of arterial dilatation. Most probably some peculiar change is produced in the homogeneous membrane of the Malpighian capillaries, affecting their filtering action. The slower and diminished breathing observed in opium narcosis depends probably on a state of torpor of the respiratory centre, itself the result of a diminished flow of arterial blood. The same condition of the hemispheres accounts for the coma, the brain being, as lately shown by Durham[1] and Bedford Brown,[2] more or less anæmic during sleep. The occasional occurrence of convulsions may, with our present knowledge, be reasonably ascribed to the cerebral anæmia. That these various phenomena depend principally on arterial contraction seems to me still more probable from the remarkable restorative effect of belladonna, which has now been observed in several cases.[3] If the vital power of the tissues themselves was deeply injured by the one drug, they could hardly so soon resume their action under the influence of the other. In one recorded case (v. 'Brit. and For. Med.-Chir. Rev.,' April, 1858) the pulse was scarcely perceptible, though the heart's beat was strong. In another, mentioned by Dr. J. W. Ogle ('Med. Times and Gaz.,' October 3rd, 1863), the surface was icy cold. Both these phenomena are mostly results of over excitement of vaso-motor nerves. While I cannot but attribute the chief part of the operation of opium to its influence on the vaso-motor nerves; I think, also, that it may in large doses (like alcohol) act paralysingly by over stimulus on the encephalic nervous centres. Indeed, both agents have in many respects the same effects. Thus both in small or moderate doses stimulate the brain, in larger produce sopor but leave the respiratory centre efficient, and in still larger doses cause fatal coma and collapse. In all cases a very great deal depends on the degree of impressionability of the nervous force, and on its condition in different parts. If the vaso-motor nervous apparatus be very sensitive as in young children the arteries are very readily occluded, and coma ensues, while in older persons the grey matter of the hemispheres will be first affected in a way of excitement, and it will require a large dose to produce a soporous state. In states of cerebral excitement it may require an almost poisonous dose of the narcotic to produce sleep. The action of the heart is commonly

---

[1] 'Mat. Med.,' vol. i, p. 708.

[2] 'Boston Med. Jour.,' vol. lxv, p. 108.

[1] 'Guy's Hosp. Reports,' vol. vi, p. 149.

[2] 'Amer. J. of Med. Sc.,' October, 1860.

[3] Lee, 'Amer. J. of Med. Sc.,' January, 1862.

increased by moderate doses of opium, or at least in no wise depressed, but after poisonous doses it becomes very feeble and failing. This results partly from the contraction of the coronary arteries admitting an insufficient supply of blood to the muscular tissue, and partly from the same state of the blood-vessels of the cardiac centres, in consequence of which they cease to supply the heart with nervous influence. In some systems there is intolerance of even the smallest amount of the drug. A lady known to me cannot take the smallest dose without becoming faint. Disease as already noticed (v. p. 206) may have the same effect, the heart's action, already feeble, becoming dangerously depressed by the opiate which is given to calm cerebral excitement or for some other purpose. It is, however, notorious how favorably opium acts when given freely in peritonitis, where the tendency is to death by asthenia. I have also used subcutaneous injection in several instances with good results where the pulse was very weak, nor can I recall to mind any where it has caused any cardiac depression. Where we apprehend any such tendency and yet wish to give it, a stimulant should be administered at the same time.

Belladonna may be ranked as the physiological opposite to opium. In full doses it causes extreme flushing of the face and head with great distension of the veins, numbness of the face, dimness of sight or even blindness, confusion of head, delirium sometimes attended with great excitement, dryness of the mouth and throat, extreme dilatation of the pupils, and often an erythematous eruption. Hogg says ('Ophth. Surgery,' p. 98) "I have frequently seen a drop of very weak solution of atropia produce in the healthy eye a very large amount of congestion in the capillary vessels, more than sufficient to deceive the practised eye of the surgeon, and which might well be mistaken for a diseased condition." The chief points of contrast in its action as compared with that of opium are the state of the pupils, the deep flushing of the face, the delirious excitement, the acceleration and sometimes increased strength of the pulse. Sopor is generally consecutive to delirium, and is often replaced by wakefulness. There can be to my mind but little question that the deep congestion of the skin of the face and head, the delirium, and the cutaneous erythema depend on arterial dilatation and increased afflux of blood in those parts. In one case the skin of the face had been as red as blood, but had quite returned to its natural state twenty-two hours later when I saw the patient; delirium had existed along with the congestion, and had disappeared with it. It is impossible to consider such temporary congestion as the result of tissue irritation, the effect of a mustard poultice would not have ceased so speedily. The acceleration of the pulse may reasonably be ascribed to paresis of the cardiac branches of the vagi, or of the vaso-motor nerves of the coronary arteries, the first being the more constant occurrence, and the second probably being added, when the pulse is not only rapid, but strong. The increased heat of the skin, the erythematous eruption, or the perspiration, all which have been observed, are easily explicable on the view of vaso-motor nerve paralysis. The evidence in favour of the pain-calming action of belladonna is very decided. Subcutaneously injected its alkaloid effectually calms the pains lingering about the joints after acute rheumatism. Trousseau does not hesitate to affirm as the result of very numerous experiments that, of all the remedies employed against the symptom pain, there is none which seems more constantly efficacious than belladonna. He admits, however, the superiority of opium in internal pains. The blindness is probably in part dependent on paralysis of the ciliary muscle, which is affected just in the same way as the iris, and through the medium of the same nerves. The numbness of the face and the weakening of muscular power are also indications of diminished vis nervosa. Botkin[1] and Michea[2] both agree that belladonna destroys the excitability of the nerves, affecting the motor before the sensory, and lastly the cerebral hemispheres. The peripheral extremities of the nerves are first affected. The heart's action was rendered weaker and more frequent, and the pressure in the arteries diminished. Thus, most of the phenomena produced by belladonna seem to be satisfactorily explicable on the view of its occasioning paresis of nervous tissue generally, and especially of the vaso-motor nerves. There are, however, two very constant results of its action which seem to be of a different kind. These are the dryness of the mouth and the throat and the dilatation of the pupil. The first seems to imply a contraction of the vessels supplying the mucous membrane and salivary glands, effected, doubtless, through stimulation of their nerves. The throat, however, has not constantly appeared to me to be really deficient in moisture, and I am much inclined to regard the phenomenon in question more as a dysæsthesia than as a real arrest of secretion. It may, however, also be explained on the view of its paralysing the gland-motor nerves, while opium sometimes does the contrary. The dysphagia and aphonia which sometimes occur are certainly paralytic phenomena, and so in accordance with the general mode of action. The question as to the action of atropine on the pupil has been admirably studied by Dr. G. Harley,[1] who considers it proved (1) that atropine does not dilate the pupil by stimulating the sympathetic as galvanism does, and (2) that it does not to do so either merely by paralysing the third nerve, supplying the circular fibres of the iris. He is most inclined to adopt Ludwig's view that the drug acts directly on the radiating fibres, and relates an experiment showing that a recently removed eye immersed in solution of atropine comes to have the pupil fully dilated in some hours, while the companion eye placed in water shows no such change. It is a very difficult question to decide completely, but after a careful perusal of the facts recorded I think there is little doubt that atropine does not stimulate the cervical sympathetic and thus produce contraction of the radiating fibres of the iris. The chief evidence is as follows:—(1) Atropine applied for twenty-five minutes to the upper end of the divided sympathetic does not cause the contracted pupil to dilate as galvanism does. (2) When the third nerve is divided the pupil dilates immediately and permanently, and the dilatation is not increased by atropine; the cervical sympathetic being now divided, the pupil contracted to one half, both sets of fibres being paralysed. (3) The pupil being fully dilated by atropine the sympathetic on that side was divided, the ear became warm, but the pupil remained fully dilated for three days, afterwards gradually contracted, and was completely so by the ninth day. (4) Sympathetic divided on one side, the contracted pupil made to dilate at first to half its extent with atropine, subsequently by long-continued application made to dilate completely. The general bearing of these facts seems to me to be that atropine does not stimulate the sympathetic, but that it acts on it as it does on other nerves, paralysing, therefore, the ciliary ganglion and nerves, as well as the third. The effect of atropine on the ciliary muscle should be taken into account. This, as having but one set of fibres, is a simpler structure, and its action can more easily be determined. Atropine certainly paralyses it, and so also does disease of the third nerve. It, therefore, seems probable that atropine acts in a like manner upon the iris with which it associated. As to the direct action of atropine on the iris it seems difficult to understand how it can affect one set of fibres without the other, the two being supplied absolutely by the same capillaries. It is very possible that the contraction of the pupil produced by division of the sympathetic depends on an increased flow of blood to the iris, and on an exaltation of the vital properties of its circular fibres, which then contract with greater energy (v. p. 22). When the divided sympathetic is galvanised dilatation ensues, because the vital power of the constrictor is now diminished, and so it is less capable of action. The radiating fibres meanwhile, though similarly affected, meeting with less resistance, shorten by mere passive contractility. Paralysis of the sympathetic makes it more difficult for atropine to dilate the pupil because of the increased energy of the constrictor, so that a greater amount of the drug is required to overcome its action. When belladonna applied to the skin of the forehead dilates the pupil of that side only it is difficult to suppose that it is absorbed, or that it directly affects the ciliary nerves. What is certain is that it must act on the sensory filaments of the ophthalmic division of the fifth, and through these it is probable that a reflex action of an inhibitory paralysing character is communicated to the third nerve.[1] Botkin's experiments seem sufficient to prove that it cannot act as a stimulant as Wharton Jones and others think. I have examined the web of the frog under the influence of atropine, both when applied locally and injected subcutaneously, but I did not observe that the arteries were notably affected. Dr. Nunneley has recently stated that the drug has no action on the blood-vessels (v. 'Proc. of R. S.,' 1869, p. 46). The circulation is very apt to be affected by movements of the animal which possibly may have been a cause of error. The state of brain in which belladonna is occasionally useful as a soporific is where there is violent excitement and wakefulness, with a contracted pupil. Dr. J. Harley concludes from his observations that the operation of belladonna is very closely allied to, if not identical with, febrile action, such as occurs in meningitis, in enteric or typhus fever, &c. In this view I am disposed very much to coincide, regarding the drug in its toxic action as the equivalent of the febrific miasm. But he adds directly after, "If we take the simplest view of the action of belladonna it is that of direct and powerful stimulation of the sympathetic nervous system." This condition cannot exist, I think, in fever, where all the phenomena are indicative of prostration; and I am, therefore, obliged to dissent from the last statement as a general one. At the same time I admit that in one locality belladonna does seem to act in this way. The remarkable effect of the drug given freely (♏xx of the tincture *2dis horis*) in severe tonsillitis may be explained by supposing it to contract the arteries supplying the inflamed part. I know, however, no evidence that it acts similarly in any other instance of phlegmasia, when it is administered internally. Applied externally to a sensory surface it certainly seems capable of arresting inflammatory hyperæmia of adjacent organs, as stated by Dr. Goolden, and more recently by Mr. C. Heath (v. 'Pract.,' November, 1868). The *modus operandi* in these cases may be either that of reflex sedation of inflamed tissues, or reflex stimulation of dilated arteries. As it does not at all excite the cutaneous nerves I do not see how it can stimulate reflexly the vaso-motor.

---

[1] Virchow's 'Archiv,' vol. xxiv, p. 83; 1862.

[2] 'Ann. de Thérap.,' 1864, p. 8.

---

[1] 'Edin. Med. Jour.,' 1856, 1857, p. 431, and p. 705.

---

[1] The above had been written a long time before I met with the following passage in Simon's 'Lect. on Pathology,' p. 219. "An anæsthetic agent operating on the peripheral expansion of the fifth nerve produces the *negation of excitement* in its centre; this condition diffuses itself to the motional centre of the iris, and as excitement would have shown itself in contraction of the pupil, so the opposite nervous condition evinces itself in expansion of that aperture. Where the reactivity of the spinal cord is very highly excited a peripheral surface may by the influence of belladonna be rendered incapable of provoking reflex movements. Thus, for instance, if a frog be rendered tetanic by opium or strychnine any contact of its cutaneous surface will produce universal spasm; if either before this poisoning, or subsequent to its manifestations, one limb of the animal be plunged into a solution of belladonna, no mechanical irritation of that portion of the body will cause the tetanic convulsion."

Hyoscyamus appears to be chiefly a simple and direct cerebral sedative. Of its calmative and hypnotic action I have no doubt, but it produces no other distinct effect when given in ordinary doses. In poisonous quantities it acts somewhat like belladonna. The narcotic effect of both drugs is, I believe, due to direct action on the nervous centres.

Aconite is certainly of great value as an external application in cutaneous hyperæsthesia and in some neuralgias, but I am shy of administering it internally. It may be used, however, in various conditions characterised by sthenic nervous excitement, certain pyrexiæ, neuralgias, and headaches, but its effect should be carefully watched lest it induce perilous depression of the heart's action.

The dose at first should not exceed ℳ x of the tincture (Ph. Brit.) *ter die.*

Cannabis Indica has certainly an influence on the brain producing not unfrequently a kind of intoxication or delirium. There seem to be great individual differences in respect to the tendency to be thus affected. In most persons an ordinary dose produces no notable effect, but in some the cerebral disturbance and the delusions, usually of a pleasing kind, are very considerable. The primary stimulant action is succeeded after a time by a sedative, but no actual narcosis appears to be produced. There is evidence that cannabis has a tranquillising influence on the spinal cord in tetanus, but it is not to be relied on for producing this effect, and does not seem comparable in this respect to aconite. My own experience is quite corroborative of Dr. Clendinning's, that it has a decidedly sedative effect in the cough of bronchitis and phthisis. Dr. Tilt says it is a wonderfully useful drug to quell neuralgia or mental excitement. In hysterical derangement, Dr. Forbes Winslow finds that the tincture will occasionally allay the excitement and produce sleep more rapidly than any other form of sedative. Fronmuller finds that it produces a more natural sleep than any other narcotic, and that its action is not attended with any unfavorable after effects. Sir R. Martin finds it very effectually to arrest the vomiting of hysterical females, and my own observation leads me to the same conclusion. Dr. Reynolds's experience of it is peculiar, he says[1] it is useless in mere functional, psychical, sensory, or motor disorders, without demonstrable organic change; on the other hand it is essentially beneficial in cases of congestion, softening, meningitis, or hæmorrhage. The drug appears to diminish the over-activity of the nerve-centres without disturbing the animal or vegetable functions. On the vaso-motor nerves I have not observed it to have any action, but Dr. Churchill speaks of it as a valuable remedy in menorrhagia, classing it along with ergot of rye. The general result seems to be that it is principally a cerebral sedative, which is not appropriate to conditions of sthenic excitement, but rather to such as manifest debility and depression with hyperæsthesia. Dr. Forbes Winslow gives a hint which is worth remembering with regard to the employment of sedatives generally. This is, that cases which are intractable to separate remedies will yield to a judicious combination of several. This is probably the secret of the success of the nostrum chlorodyne.

---

[1] 'Arch. of Med.,' Jan., 1861.

Of *Conium* I know personally very little. Dr. J. Harley regards it as being "to the corpora striata, to the smaller centres of motion, and to the whole of the motor tract, precisely what opium is to the brain of a person readily influenced by its hypnotic action, and, just as opium tranquillises and refreshes the over-excited and weary brain, so does conium soothe and strengthen the unduly excited and exhausted centres of motor activity." In a case of chorea, æt. 9, I gave ʒvj of succus conii in the day, but no good effect was produced in 3 days.

Bromide of Potassium has been alluded to so often that I need only recapitulate by saying that it seems to be a valuable remedy in all cases of hyper-excitability of motor, sensory, or intellectual centres, provided only that debility is not excessive.

A new remedy, *Chloral hydrate,* is said to be efficacious as a calmative and hypnotic in traumatic delirium proving refractory to opium, and in similar states. The dose is ʒss; which may be repeated 3 or 4 times. Sometimes ʒj has been given, or gr. x in a subcutaneous injection.

Hydrocyanic acid is familiar to us all as an useful sedative in gastric and bronchial irritation. It is evidently a nervine, but its *modus operandi* is not at all clear. In poisonous doses it produces tetanic convulsions and insensibility, preceded by faintness and giddiness; the pupils are dilated, the pulse is small or imperceptible. In a good-sized young dog, whom I injected with two ♏xxx doses of acid. hydroc. dil. subcutaneously, at about ten minutes' interval, the effects were as follows. He was prostrated in a few minutes, lay quiet with deep but infrequent breathing, and quick but feeble pulsation of the heart, whose sounds were just audible. After the second injection the breathing became slower, and the heart's action feebler, and so he died very gradually in about twenty minutes from the first introduction of the poison. A stimulus to the cornea caused contraction of the orbicularis palpebrarum from seven to ten minutes before death, but not about four minutes later. At the autopsy made two hours after death the limbs were not rigid, the lungs were moderately congested, the heart was well and firmly contracted, its tissue remarkably firm, the cavity of the left ventricle almost quite obliterated, that of right small, but little blood in either, coagula in both auricles. Brain decidedly pale. From this it almost appears as if the heart's action had been arrested by over-stimulus of its nerves, tetanising it. Perhaps convulsions and insensibility are produced by similar tetanising of the cerebral arteries. Such, however, are the effects of over-doses, and they do not throw any light on the results of ordinary ones. I believe we must for the present be content to think of the drug as a direct sedative to nervous tissue. As such it has been used lately with great success by Dr. K. McLeod in cases of insanity attended with excitement.

It is impossible not to note a considerable similarity between the effects of stimulants and sedatives. Opium and brandy, as it was once remarked to me, are nearly the same things. So much is this the case that it forms no mean argument of the true nature of pain and spasm, which are often relieved by one or other, or by both together. A strong dose of alcohol, a subcutaneous opiate, or a dose of opium and ether may all quell an asthmatic paroxysm. Yet we must not forget that there are specific differences among sedatives which make one much more suitable to one individual, and in one condition than another is. Nor must we overlook the fact that two of our most efficient sedatives, Antimony and Bromide of Potassium, are quite the reverse of stimulants, or, again, that some stimulants have no narcotic action at all. Just as morbid actions have together with much that is common much that is special, so it is with remedies (v. Trousseau, Vol. I, p. 481).

There is some evidence that the inhalation of *Oxygen gas,* diluted in the proportion of from 2 to 12 per cent. for small doses, and to a very much less degree for large doses, has a beneficial effect in various disorders, among which some neuroses may be reckoned. One of my own patients declares that he was restored by this means from a state of extreme depression in a marvellous way. Dr. Birch,[1] who has had the principal share in bringing this remedy forward, does not recommend it in nervous hyperæsthesia or chronic cases of extreme debility and spanæmia. He has found its good effects most decided "in persons of a gouty or strumous habit, or otherwise in a state of general *malaise,* with sluggish circulation, either constitutional or superinduced by an atonic and oppressed condition through overfeeding and other luxurious habits." In some cases improvement coincides with critical discharges of retained excrementitious matters. Mr. Hooper[2] records an intractable case of neuralgia of the sole of the right foot which was cured after much other medication had failed by the inhalation of oxygen. The patient was a labourer, æt. 40, the whole foot was exceedingly hot, the agony beyond description. No mention is made of gouty tendency. During the inhalation the urine became increased in quantity, and loaded with urates and phosphates. It seems probable that the remedy may be useful in cases rather of indirect than of direct depression.

---

[1] 'Brit. Med. Journ.,' Dec. 24th, 31st, 1859.

[2] 'Brit. Med. Journ.,' March 15th, 1862.

It is more difficult to decide as to the therapeutical value of *Electricity* than of most other remedies. For—(1) we are often obliged in justice to the patient to administer medicine at the same time, which complicates the question; (2) the application of electricity is not a very ready or facile matter, the apparatus is cumbrous and apt to get out of order; (3) which is the chief hindrance, we find ourselves much at fault in determining to what cases it is applicable, and what kind of electricity should be employed. The superior convenience of most other remedies will generally give them a preference in the first instance, so that it is mostly the refractory cases too often incurable which are treated by this means. However, if even a minority of such patients are cured, the evidence is of course very strong of the efficacy of the method. At present it is impossible to state precisely what is its comparative value—Dr. Anstie thinks that as yet it has achieved no results which entitle it to more than a third- or fourth-rate place among remedies, but is hopeful that if the apparatus can be improved it may equal or exceed in value any remedies at present available. My own feeling is that it achieves great success in certain cases, but that it is very difficult to define how such cases are to be distinguished. This applies much more to Galvanic and Statical electricity than to Faradaic.

The induced current (Faradisation) is that which is most commonly employed, and about which we have most experience. It is a high tension current, moving to and fro, and therefore without positive and negative poles. It seems to be essentially a stimulus which rouses nerve and muscle to action, and may be very serviceable as long as the endowments of these tissues exist, though in what may be termed a torpid state. If, on the contrary, these endowments are lost, if the nerve or muscle has seriously degenerated, Faradisation is of no avail. This, however, is not the only condition of its efficacy, but we can hardly say anything definite of others. If a paralysed part remained unaffected by the induced current after 2 or 3 trials it would probably be well to resort to some other form of electricity. Faradisation produces good results in the sensory disorders of hysteria, especially in anæsthesia. For hyperæsthesia I should prefer Galvanism. I have seen the latter succeed when faradisation failed. The proper mode of applying the induced current is to place one moist sponge over the motor nerve, and to move the other sponge about over the surface of the paralysed muscles. In sensory disorders dry conductors are advised, as the wire brush. By employing a conductor insulated, except at its extremity, the large intestine, the bladder, and the uterus can be beneficially stimulated. Care should be taken never to employ too strong a current—electricity, like all other stimuli, if over-powerful, paralyses. It is noteworthy that an induced current passed through a part of one limb, say the inner part of the forearm, will cause electrical commotion in distant parts, as in the great toe of the same side, or in muscles of the forearm, supplied by the radial, the current being sent through the ulnar nerve. This implies that the influence of the current extends beyond its track, and is diffused centripetally to the nerve-centres. Duchenne and others recommend the primary current of the galvano-induction machine as more efficacious in paralysis than the secondary (the induced) current.

Dr. G. Beard, U.S., employs a method which he terms general electrization. The feet of the patient are placed on a sheet of copper to which the negation pole is attached, while the positive, either a large sponge or the hand of the operator, is applied over the head (the hair being previously moistened), on the back of the neck, down the entire length of the spine, down the arms, over the stomach, liver, bowels, down the lower extremities—in short, over the entire surface of the body from the head to the feet, but with special reference to the head and spine. He has found this procedure successful in cases where internal medication has failed. It increases appetite, promotes sleep, and develops the size and weight of the muscles. Either the Faradaic or Galvanic currents may be used.—('Boston Med. and Surg. J.,' April 29th, 1869).

The continuous current, Galvanism, comparatively of low tension, seems to be appropriate to conditions where the nutrition of the nervous and muscular tissues has become seriously impaired, as well as to sundry others which it is very difficult to particularise. We do not yet know sufficiently the best way of using the current.

A priori one would be inclined to think that a mild current transmitted for a long time through the affected part would be most useful, and I think there is no doubt this method (Pulvermacher's chain) is productive of good effects. But there is also much testimony to the great efficacy of currents passed for a few minutes, 5 to 15, or even less. The size of the elements to be employed, and, consequently, the quantity of electricity transmitted, is also not determined. Pulvermacher's chain affords but a small quantity of electricity, but if this is sufficient it is of course very preferable to the large fixed batteries. The tension of the current depends on the number of elements, and it seems desirable to operate with as few as may be; saturating the epidermis previously with salt-solution materially facilitates the penetration of the current. Remak distinguishes "stabile ströme," currents passing through electrodes kept to determinate spots, and "labile ströme," currents where the electrodes are kept moving about over the surface. In general stabile currents calm, while labile excite, yet in some instances the anti-paralytic effect of the first is greater than that of the second. There are certain cases of facial palsy in which the induced current has not the least power to make the muscles contract, while a very feeble continuous current produces at opening and closing of the circuit most powerful contractions. These cases rapidly improve under this treatment, and at a certain date the continuous current loses its efficacy, and then the induced current will act upon the muscles. In paraplegia, and especially in the affection known as creeping palsy, which begins with the lower extremities and reaches the upper, and even the cerebral nerves, the constant current has been found very useful by Remak. In a case which was going on rapidly the labile current, from 25 elements applied upon the nucha and the two inferior ganglia of the sympathetic for about 12 minutes, produced surprising effects. In fact, he was entirely restored to perfect sensory and motor power at two applications, and had no relapse whatever. In ataxic paraplegia the constant current is no less useful than in the more usual form. In hysterical paraplegia the poles applied over the lumbar region and the solar plexus have produced the happiest effects. Remak divides the spine into 3 zones, the first includes the region between the occiput and the 5th cervical vertebra, the second extends from the 5th cervical to the 6th dorsal, and the third the remaining space down as far as the lower extremities. In order to excite what Remak calls "diplegic" contractions it is necessary to place one electrode within one of these zones and the other in a different zone. It is not necessary that both electrodes should be placed on the same side as the muscles which are to be affected; on the contrary, a cross current is often efficacious. If both electrodes are placed in the same spinal zone the effect is *nil.* Remak considers that the current acts on the sympathetic ganglia, but how by this proceeding paraplegia and progressive muscular atrophy are to be cured it is not easy to conceive. Benedikt, however, seems to have found this method of great service in neuralgia of the fifth pair. He galvanizes the sympathetic with a current, from 10 or 12 cells at most, and only for half a minute at a time, warning that most serious accidents may occur if these rules are neglected. He has achieved some astonishing cures of the worst forms of facial tic by this method. In spinal neuralgia the zinc pole should be placed on any vertebra which may happen to be tender, so as to make the current come out through it. Where the nerve-roots are supposed to be affected the positive pole is fixed upon the vertebra opposite the highest nerve origin that can be concerned, and the zinc pole is stroked down by the side of the spine processes some 40 times in succession. This, Benedikt says, is most effective treatment. In a very severe and refractory case of neuralgia of the second division of the fifth I found galvanization, the positive pole being applied to the seat of pain and the negative placed in one hand, always afford much relief for 2 or 3 days. Dr. Althaus regards the continuous current as a peculiar stimulant to the cutaneous nerves, acting through them on the cord or higher centres. A case of general hysterical paralysis with aphonia and amenorrhœa was cured by a current from 40 or 50 Daniell's elements sent in an inverse direction from the nape to the sacrum. The treatment is beneficial not only in functional but in some severe organic lesions of the cord.

Respecting Statical electricity we have less therapeutical experience than we have of the two other forms. Regarding it, however, as a different, though not dissimilar, stimulus, and bearing in mind the manifold idiosyncrasies of the human body, we must deem it reasonable to employ it in any case where no material disorganisation or degeneration exists. Shocks passed through the pelvis have cured amenorrhœa, and taking sparks from the spine has proved of eminent service in chorea.

Eulenburg makes the remarkable statement, which I can confirm to some extent by my own experience, that the motor nerves have specific susceptibilities to the stimulus of Galvanism, Faradisation, and Volition, and that they may lose one or other of these, while one or both of the others remain intact. A patient under my care, who had paralysis of the muscles of his hands in consequence of myelitis, regained voluntary power, but his muscles scarcely acted at all either with Galvanism or Faradisation. This fact seems to me well nigh conclusive as to the non-identity of the nervous force with electricity.

The operation of *Cold* on an ordinarily vigorous system is, as we have seen, tonic and invigorating (v. p. 30 *et seq.*). It increases nervous power and specially excites the smooth muscular fibres of arteries and of the skin, as well as the nerves influencing them. Catarrhal affections are much more prone to ensue on the supervention of a thaw than during a sharp frost. In its greater degrees, and in feeble states of the system, it is often depressing, partly we may believe by obstructing the free flow of blood through the arteries. The suppression of the catamenial discharge by the application of cold to the feet, of hæmoptysis by ice to the chest,[1] and the beneficial effect in cases of cerebral hyperæmia of cold to the scalp, indicate, I think plainly, that cold acts through the incident nerves in a reflex manner upon the vaso-motor, and causes arterial contraction. We shall see presently that heat has just the opposite effect. It seems to me very probable that the extreme drowsiness which is produced by intense cold depends on a want of a due supply of arterial blood to the brain, the congestion which is so often observed is probably chiefly venous, and dependent on the mode of death, viz., by coma. The toning antineuralgic influence of dry cold is well shown in the following case.

Case 1.—W. L—, æt. 32, a healthy man. Rather more than 2½ years ago was struck by some small shot on the head, and has suffered ever since with pains continually flying about the part, not felt anywhere else. The head felt stiff, and tender, and heavy, and dull, he could not find a comfortable position to lay it in. During the cold frosty weather the head was a great deal better, and it was much relieved by pumping cold water upon it. Health quite good all the time. The shots were removed by operation, were flattened and imbedded a little in the bone. After their removal the pain ceased.

---

[1] Currie recommends immersing the lower limbs in cold water as a means of arresting hæmorrhage from the lungs (Vol. I, p. 300). Marion de L'Orme, as Tallemant relates, who had good reasons for wishing to preserve her beauty, used to sit whole mornings with her feet in water to cure herself of a redness of the nose.

Cold, however, when excessive relatively to the power of the system, acts paralysingly like many other influences. The imminent peril which Alexander incurred by an unseasonable plunge into the cold Cydnus is well known, and affords a good example of inhibitory depression of the heart's action. A similar act caused the death of 3 out of 4 young men mentioned in Currie's work (Vol. I, p. 120). Sir R. Martin says the cold bath is death in the collapse which *follows* a debauch, or, indeed, any other great fatigue of mind or body. Still we need not be over cautious. I have several times, when pretty well fatigued, bathed in the glacier tarns of Switzerland without injury.

It is very remarkable and interesting that the effects of heat are in some measure identical with those of cold. Hot water, as hot as can be borne, has been found a most powerful styptic in bleeding occurring after extraction of a tooth (v. 'Dublin Med. J.,' May, 1859, p. 487). Trousseau states that in the epistaxis of measles hot water thrown into the nasal cavities is even more effectual than cold. Dr. Druitt also recommends the same remedy in cases of profuse sweating, where the flux is localised, and not preceded by regular febrile paroxysms. The *rationale* of the effect is probably that the stimulus of the heat applied to sensory nerves produces energetic contraction of the vaso-motor. In some experiments I have performed, holding a thermometer in one hand and immersing the other in very hot water, the *first* effect of the high temperature was to cause a slight fall of the mercury, which subsequently rose much more as the water became cooler.

The action of *moist Warmth*, whether applied by warm baths or in any other way, is worth considering. It may be stated (1) that it is generally soothing and comforting to sensory nerves in a state of neuralgic suffering, as, for instance, in the headache of influenza, in the suffering produced by gall stones, and in the case of tic douloureux recorded at page 504, but not so constantly in the pain of inflammatory congestion, which, as in the case of a burn, is often arrested by cold. However, there is good evidence that in these same affections, even when very severe, moist warmth may be one of the best means that can be employed. Mr. Windsor[1] says, "Many years since we convinced ourselves by a series of comparative experiments that there was no treatment for the collapse which generally accompanies severe burns so efficacious as the warm bath. In our cases the pain at once disappeared, and sometimes did not return, the pulse improved, and the countenance lost its anxious and sunken cast; the bath, however, was never continued for more than an hour." He thinks this treatment would often save life. Hebra relates a case of severe burn, the subject of which nine days after its occurrence was suffering intense pain, and could neither stand, sit, nor lie down straight. She was placed in a bath at 99·5° F., and an hour later she could stretch her legs, and the pain had disappeared. In forty-eight hours the pulse fell from 120 to 80, the thirst became less, and the appetite increased. She remained altogether fifty hours in the water, the temperature of which was gradually lowered to 88° F., and recovered well. The beneficial action of cold in inflammation depends on its keeping the arteries contracted, and the part anæmic—if it does not effect this it is rather irritating. (2) Moist warmth seems to abate the tissue irritation, the attractive *nisus*, which constitutes the essence of sthenic inflammation, causing afflux to and arrest of blood in the part independent of arterial dilatation. In a case of very aggravated psoriasis under my care the skin was paler after an hour's packing in a wet sheet than at any other time. The beneficial effect of poultices and fomentations on inflamed parts, including the viscera of serous cavities, depends chiefly on this sedative action on the tissue, which extends even to the deeper parts. (3) I think we may be pretty sure that moist warmth applied to the cutaneous surface through its action on the afferent nerves and nervous centres relaxes the nerves and vessels of internal parts. A female, whose catamenia returned too frequently, informed me that soaking her feet in hot water would bring on the discharge at any time. The common prescription of a warm hip-bath in amenorrhœa probably acts on the same principle, as otherwise it would be more likely to determine a flow of blood to the cutaneous surface than to the uterus. A writer in 'Lancet,' Sept. 3rd, 1864, found hot bran bags applied to the lumbar and sacral spine increase uterine hæmorrhage in a marked manner, though they relieved pain. The benefit of a warm bath in children's convulsions probably depends on its calmative effect exerted through the sensory nerves of the surface on the brain. It acts much in the same way in relieving sleeplessness. It should, however, not be administered indiscriminately, not if the head be flushed and hot, and the eyes injected.

---

[1] Syd. Soc. 'Year-Book,' 1863, p. 205.

Beneke[1] and Clemens[2] agree that the general effects of baths depend upon their action on the nerves of the skin. The latter finds that simple or medicated baths always produce their greatest diuretic effect in the first fifteen or twenty minutes—he could detect none of the substances dissolved in the bath water in the urine. The diuretic effect was marked, especially in increasing the flow of water, and the excretion of phosphates and other fixed salts. The chloride of sodium and urea were not much increased. Beneke lays stress on the importance of the stimulus of the bath being appropriate to the state of the system; if it is, it causes a general sensation of well-being, a bodily and mental exhilaration, some increased frequency of pulse, and generally, and as an ultimate result, an increase of nutrition, and of the weight of the body. If, however, the stimulus is not suitable to the individual, these beneficial effects are replaced by shivering, lassitude, febricitation, restlessness, and loss of weight.

The special advantage of the warm bath consists in the circumstance that a very large sensory surface is mildly and equally stimulated, so that all the cerebral and spinal centres are moderately excited. It is on this principle that such baths as those of Gastein and Wildbad, scarcely more than hot water, act efficiently in cases of paralysis of exhaustion. This is the primary and beneficial effect, but if the temperature be too high, or the bathing too prolonged, we then have debility and nerve exhaustion produced, which may even cause syncope, not always recovered from. The same influence which relaxes the internal arteries, and thus promotes more free circulation through the brain and cord, if carried too far, or used in too weakly a system, depresses the action of the heart, sometimes even seriously.

Similar views seem to me very applicable to various medicated baths of ascertained efficacy in different neuroses. Thus sulphuret of potassium baths are certainly useful in chorea, in lead paralysis, in some cases of asthma, and in some of eczema. It is difficult to believe that the remedy can act by removing the causes of these disorders, while it is certain that it must exert an influence on the cutaneous nerves, which, communicated to the centres, may there effect changes which materially modify the morbid phenomena. In the following instance, mentioned to me by Dr. Tyler Smith, the nitro-muriatic acid lotion appears to act in a way which can only be explained by the view that certain nerves of the parietes exert an influence on those of the contained viscera. A lady whose liver is habitually torpid always gets a well-coloured bilious motion from the application of spongio-piline, saturated with nitro-muriatic acid lotion, to the right hypochondrium, but a foot-bath of the same has no effect.

---

[1] Schmidt's 'Jahrb.,' vol. cxv, p. 101.

[2] 'Med. Centr. Ztg.,' xxx, 53, 59, 1861.

In appropriate cases, such as are not suffering under active disease, there is no calmative which is more effectual than an atmosphere and climate suited to the state of the system. In asthma, in chronic sleeplessness, and in a variety of obscure nervous disorders, change to a pure and suitable air may be of far more value to the sufferer than any drug or mode of treatment. This is eminently the case in removal from London to the country. The cessation of the unending hum and clatter of London traffic, the perceptible stillness, affects the brain with a pleasant sense of rest, and contributes materially to the beneficial effect of the air. A judicious selection of locality is, however, most important. The atmosphere which tones, braces, and calms one system will injuriously affect another, and the moist relaxing air of our southern and western coasts which may calm a highly excitable, tensely-nerved system will seriously depress one of an opposite quality. For many invalids convalescent, or semi-convalescent from tropical disease, the air of the Scottish moors and mountains is, I believe, preferable to any in our island. Were I similarly affected I should wish to betake myself to the Swiss Alps, avoiding, however, absolutely the close valleys which are often most pernicious. I would say to every traveller in search of health, consider well where you make even a brief stay, for a night or two in a locality where the aspect of the population tells of malaria may infect you with a taint which it may be hard to shake off, even if no worse occur. I shall not as long as I live forget the scene that I witnessed at Martigny during the day I halted there. A week of illness spent there, commencing, apparently, in a mere diarrhœa, bereft a young affectionate wife of her husband, and left her to finish in grief the journey which had begun so joyously.

Dr. Hermann Weber says that the nervous system is influenced, in a very marked manner, by a stay on the Alps; sleeplessness, hysterical and neuralgic affections, as also hypochondriasis, often disappear. He mentions one remarkable case where a hard-working student, habitually distressed by insomnia, gets immediate and complete relief as soon as he locates himself 3000 feet or more above the level of the sea, but no other change has any effect. With other persons the reverse is the case; a patient of my own never sleeps well on a high elevation.

In some cases frequent change is more efficacious than a continued residence in any one locality. This applies very much to the slight teasing febrile affections which hang about some who have previously suffered with malarious fevers. For those who are tolerable sailors sea-voyaging, under favorable circumstances, is one of the best restoratives. To many Indian invalids the long sea-voyage would I am satisfied be safer and more health-promoting than the overland route.

THE END.

LEEDS SCHOOL OF MEDICINE

INDEX.

PAGE

A.

Abdominal neuralgia, cases of and remarks on 662–669
— relation to epilepsy 669
Aconite, uses of 819
Anæmia, cerebral 64
— — cases of 69–80
— — diagnosis of... 77
— effects of acute 65
— chronic 66
— spinal 82
— — case of 83
— — remedies in... 85
Angina pectoris 575
— minor 581
— treatment 584
Aorta, abdominal, undue pulsation of 612
— causes 613
Aphonia paralytica 622
— Dr. M. Mackenzie on 623
Arsenic in asthma... 642
— in gastralgia 673
— in menorrhagia 727
— in malarious fever 784
— acts on the nervous system, both cerebro-spinal and vaso-motor . 802
— may become a tissue irritant... 802
Asthma, views as to state of chest in 636
— nature of morbid action ... 637
— various exciting causes 638, 639
— may simulate broncho-pneumonia 640
— treatment, prophylactic 640–642
— — remedial 642–644
Atmosphere, effect of 831
Aural pain... 534
Azoturia, cases of 710, 711
— symptoms of 712
— relation between excretion of uric acid and urea 713
— relation of azoturia to dyspepsia 714
— theory of disorder 714

PAGE

Azoturia, treatment 715

B.

Baths, Beneke and Clemens on effects of 829
— action of medicated 830
Belladonna, action of 815
— its influence on the iris ... 817
— its effect in tonsillitis 819
Bladder, irritability of 700
— treatment of 701, 702
— influence of azoturia 702
— neuralgia of 703
— paralysis of 708
— paralysis of sphincter 709
Blood-corpuscles, escape of, through leaks in the wall of the capillaries 62
Brachial neuralgia, cases of 550–555
— dependent on acidity or other disorder of stomach ... 556, 557
— remarks on treatment... ... 558
Bromide of potassium, its use in delirium tremens 208
— — in epilepsy 325
— — in sleeplessness 414
— — in headache... 423
— — in cardiac disorder... ... 582
— general view of action ... 821

C.

Cannabis Indica, effects of ... 820
Cardiac neuroses, p. 574; nerves of heart, p. 574: angina pectoris, p. 575; cases of angina pectoris, pp. 577–580; angina pectoris minor, p. 581; influence of gout, tobacco, changes of temperature on, p. 583; treatment of angina, p. 584; influence of gastric disorder on heart, p. 586;

PAGE
neuroses from rheumatism, p. 588; from malaria, pp. 590–598; from lead, p. 598; in connection with Graves' disease, p. 599; with epilepsy, p. 600; inhibitory paralysis of heart, p. 602; toxic neuroses, p. 604; cardiac hyperæsthesia, pp. 605, 606; unusually rapid action of heart, p. 607; slow pulse, pp. 610, 611.
Catalepsy, endemic 277
— from intestinal irritation ... 278
— in hysterical persons 280
Catamenial period, nerve disorder aggravated at 55
Capillaries may lose their retentive power in nerve disorder . 59
Cerebral excitement from mental strain 161
— from masturbation 163
— from belladonna 166
— from syphilis 167
Chlorodyne, why useful 820
Cholera, symptoms dependent on intestinal irritation 692
Chorea electrica 378
Chorea, precursory phenomena, p. 343; motor disorders in, p. 344; sensory, p. 344; emotional and intellectual, p. 345–349; causation of, p. 349; fright, imitative tendency, p. 350; toxic causes, p. 351; rheumatism, p. 352; endocarditis, p. 353; intestinal irritation, p. 355; pregnancy, p. 356; intra-cranial projections, p. 357; meningitis, p. 359; significance of cerebral lesions in, p. 359; urine in, p. 361; rationale of events in, p. 362; modified and partial chorea, pp. 362–366; treatment of, pp. 368–378.
Cold, action of, on internal nerves 31
— tonic influence of 827
— inhibitory effect of 827
Conduction, law of isolated ... 6
Congestion, apoplectiforme cérébrale 65
Conium, Dr. Harley's view of its action... 821
Constipation from pedestrian exercise 699
Convulsions, infantile and puerperal, dependent on hyperæmia 329–333
— or hyper-excitability ... 334–383
— relation of infantile convulsions to epilepsy 294, 339

PAGE
Convulsions, overfeeding as a cause of 339
— remedies in infantile ... 336, 341
Cramp, writers' 397
Crural neuralgia 566
Cutaneous neuroses 734
— hyperæsthesia 735–737
— anæsthesia 741
— analgesia 742
— may be due to neurolytic or inhibitory causation or hysteria 744
Cutaneous vaso-motor nerve paresis 744
— — — spasm... 747
— — — — cases of ... 749, 750

D.

Deafness occasionally a neurosis 532, 533
Delirium, varying quality of ... 158
— from mental excitement ... 159
— in acute rheumatism ... 169–172
— in typhus 173
— in intermittent fever 173
— post febrle or of collapse 174–177
— hysterical 178
— epileptic 179
— traumatic 181
— puerperal 183–185
— treatment of active ... 186–192
Delirium tremens not a mere toxæmia 193, 194
— effect of abstinence in inducing 195
— tends to terminate spontaneously 196
— is of varying quality 198
— prognosis in 199
— treatment, depressant... 200–205
— — sedative 205–208
— — by digitalis, ice-bag, capsicum, quinine... ... 209–211
Deltoid, paralysis of, cured by continuous current 559
Dementia, acute, cases of... ... 109
Diabetes, insipidus, treatment of . 791
Diagnosis, mere nominal, insufficient 3
Dickinson on function of cerebellum 5
Digitalis, its mode of action ... 806
— its efficacy in menorrhagia, in pulmonary hæmorrhage, in neuralgia, in syncope from hæmorrhage, in enfeebled heart 807, 808
Diphtherial paralysis, cases of 148–151
Disease, variable 2
Drowsiness, natural 403
— morbid 404

PAGE

Drowsiness from toxic causes, intra-cranial pressure, remote irritation 405
—from plethora 407

E.

Eccentric phenomena, law of ... 8
Electricity, therapeutical value of 823
— statical, use of... 826
Electrization, general 824
Epilepsy, range of term 284
— various forms of ... 287–294
— ætiology of 294–303
— pathology of 304
— rationale of paroxysm ... 310
— sequelæ of 312–314
— trephining in 317
— counter-irritation in 321
— depletion in 321
— purgation in 322
— belladonna, morphia, bromide of potassium, chloroform in... 323
— tonics in 325
— specifics in 326
— interception of aura 327
— diet in 327
— posture at night 328
— mental occupation in 328
Epileptiform neuralgia 511
Excitability of nerves proportional to debility 54
Excitement, cerebral, physiological 755
— morbid 157
Excito-motory actions 7
— -sensory action... 7
Exercise, effect of, on vasal nerves 27
— — vagi 28

F.

Facial paralysis, may be produced by emotion, or by inhibitory depression 513
— other nerves simultaneously affected 515
— double 514
Faradisation, how and where to be employed 823
Febrile state, compared to toxic effect of belladonna 819
Fever, relation of, to nerve disorder 36
Flatulence may be a neurosis ... 687
— rectal, a sequela of dysentery... 694
Functional disorder 3

G.

PAGE

Galvanism, effects of 824
Gastralgia, cases of ... 672, 673
Gastric hyperæsthesia, cases of 675, 676
— dependent on pregnancy ... 681
— on other remote irritation ... 683
— abated by subcutaneous opiate injection 680
— abated by cold affusion ... 678
— diet in 678
— relation to ulceration 677
Graves' disease, case of 652
— proptosis in 654
— gôitre in 655
— excitement of heart 655
— impairment of nerve power in . 656
— hæmorrhage in... 656
— mucous profluvia 657
— mental excitement 657
— increase of temperature ... 657
— urine and pulse in ... 657, 658
— autopsies in 658
— theory of disease 659
— treatment 660

H.

Hæmatemesis, neurolytic, cases of 684, 685
Hæmatinuria, intermittent 718, 719
Hæmorrhage from large intestine, of malarious origin and choleraic 695, 696
Hæmorrhagic effusions from urinary organs 716
Hæmoptysis, neurolytic 649
— depending on pregnancy ... 650
Headache, neuralgic, hyperæsthetic 416, 417
— hyperæmic 418
— inhibitory 419
— toxic 421
— treatment 422–426
— illustrative cases ... 426–437
Heat, action and effects of, 33, 34-36, 827
Heat-stroke 213
— heat of blood in 215
— autopsies in 215
— symptoms produced by, in less severe cases 218–221
— sequelæ of 221–224
— etiology of 224–226
— pathology of 226–232
— associated pathology of 232–234
— treatment of 236
Hiccup, malarial 647
— from fright 647
— treatment 648

PAGE
Hot-air bath, effects of 35
Hydrocyanic acid, action of ... 821
Hyperæmia, cerebral 86
— physiological 86
— pathological 86
— prone to terminate in apoplexy in severe remittent fever ... 87
— effects during life 88
— causes 89
— changes produced by 92
— treatment of 93
— spinal 98
Hyperæsthesia, conditions giving rise to... 48
— not a true increase of sensory power... 47
Hypochondriasis not to be slighted 487
— cases of... 488
— causes—gout, remote irritation, neurolysis 490–493
— relation to melancholia ... 490
— treatment 494
— effect of mountaineering on ... 495
Hysteria, its twofold origin ... 469
— dependent on toxæmia ... 470
— — on exhaustion 470
— — on remote irritation ... 471
— — on structural lesion of brain 471
— — on morbid mental states ... 473
— illustrative cases ... 475–478
— discrimination of from mental perversion and bodily disorder 478
Hysterical hemiplegia 480
— mania 482
— coma 484
— epilepsy 485

I.

Inflammation caused by vaso-motor paralysis 20
— varieties of, *tissue* and *nerve* ... 794
— necessity for different treatment of each 795
— exudation a reality 795
— inhibitory causes may give rise to 797
Influenza a cause of cerebral paresis 123
Inhibitory influence, account of ... 9
— instances of 11
Intestinal obstruction, cases of 690–692
— use of strychnia in 690
Iron may act as a nervine tonic ... 804
— large doses valuable in asthenic inflammations 804

L.

PAGE
Laryngismus stridulus, cases of 629, 630
— treatment by opium 632
— — by tickling the fauces and Bromide of Potassium ... 633
— — by exposure to dry cold air 635
Larynx, neuralgia of 623
Lasègue on catalepsy 280
Lingual hyperæsthesia, cases of 545–547
— neuralgia 623

M.

Malarial disorder widely prevalent, p. 754; apt to be multiform and perplexing, p. 755; action of malaria twofold, causes paralysis and spasm, p. 756; rationale of an ague fit, p. 756; examples of pernicious malarious fevers, pp. 758, 759; sudoral and algide fevers, p. 760; malarial collapse, p. 761; occurrence of aguish disorder in London and Paris, pp. 762, 763; malarioid remittent in London, p. 765; cases of, pp. 765–770; sequelæ of, pp. 773, 774; Bierbaum and Guiet on ague in young children, pp. 771, 772; obscure remittent cases of, pp. 775–782; remarks on its connection with typhoid, p. 782; treatment of refractory cases of malarious fever, p. 783; and of allied disorders, p. 784; connection of malaria and influenza, existence of various miasms operating similarly, p. 785.
Malarious localities, danger of stay in 831
Melancholia from influenza ... 165
Mountain climate in hypochondriasis, sleeplessness, &c. 495, 832
Myalgia 572

N.

Nerve disorders, analogy between central and peripheral ... 55
— not necessarily dependent on variations in the blood-flow... 57
Nerve-fibres capable of transmitting several different impressions 49
Nervous centres, commissural connection of 18

PAGE

Nervous centres, grouping of ... 5
Nervous disorder most prevalent at night 54
Neuralgia, essential nature of ... 44
— seat of 50
— pathological relations of ... 53
Neuralgia, facial, different forms of, p. 497; from reflex irritation, pp. 498–501; from central disease, 501; from malaria, p. 503; rheumatic, p. 504; of hyperæsthetic quality, p. 502; may be complicated with cerebral symptoms, p. 507; associated with erysipelas, p. 509; hemicrania, p. 509; division of nerve affected in, 510.
Night-terrors, cases of and remarks on 452, 453
— treatment of 455
Nitric acid, action of 809
Notta on paralysing effects of neuralgia 15
Nutrition, loss of nervous influence on 751–753

O.

Œsophageal dysæsthesia 538
— stricture, spasmodic, examples of 541–543
— — diagnosis of... 543
Opium, action of 810
— constringes vessels 811
— objections to the view of its stimulant action discussed ... 812
Ovarian neuralgia, symptoms of... 728
— treatment 728
Overwork a cause of cerebral paresis 120
Oxygen gas, its use 822

P.

Paralysis agitans, functional ... 383
— organic... 382
— of vaso-motor nerves of eyes, case of 529
— neurolytic 17
— reflex, Brown-Séquard's views of 13
— — Weir Mitchell on 14
Paralytic pyrexia, Hutchinson on . 21
Paresis, cerebral 103
— from inhibitory influence ... 114
— from pregnancy 118
— treatment of 125

PAGE

Paresis, spinal — 127
— — from influenzal catarrh ... 128
— — from over-exertion... ... 130
— — in children 134
— — from tobacco smoking ... 137
— — fatal cases of, with autopsies 138
— — from vesical irritation ... 140
— — in diphtheria 145
Periodicity of nerve disorder ... 62
Pertussis 624
— remedies 626–628
Pharyngeal dysphagia 539
Pyrexia, how produced 41

Q.

Quinine acts on the nerves, cerebro-spinal and vaso-motor ... 800
— increases nerve-force 801
— beneficial in various inflammations 801
— may be used subcutaneously ... 801
— large doses recommended in heat-stroke 801

R.

Rectum, neuralgia of 698
Respiratory neuroses, p. 615; hyperæsthetic dyspnœa, pp. 615, 616; hyperæsthetic cough, p. 617; cases of, p. 618; anæsthesia of respiratory nerves, p. 620; paresis of respiratory nerves, p. 621; aphonia paralytica, p. 622.
Retinal hyperæsthesia, essential seat of 517
— may be removed by fright ... 519
— treatment 519
— illustrative cases of ... 520–522
Retinal anæsthesia, facts relating to 523
— cases of 524
— treatment 525
Retinal paralysis, result of commotion, exhaustion, irritation, tobacco, lead ... 526–529
Rigors, mode of production ... 41

S.

Sanguineous perspiration, instances of 60, 745
Sarcinous vomiting cured by tonics 687

PAGE
Sciatica, causes of—
— — gout 563
— — gonorrhœa 563
— — syphilis 562
— — hæmorrhoids 562
— treatment 564
— cases of, with remarks 567–571
Secretion fluxes, of salivary glands 787
— of liver 788
— of kidneys 790
Sedative applications, modus operandi of 52
Sensations, not always referred to periphery 51
Sleeplessness, conditions giving rise to 409–412
— remedies for 413
Sneezing 644
Spasm, facial 389
— of neck and shoulders 392–394
— cured by continuous galvanic current 398–400
— — by atropia injection ... 399
— — by elongation and rest ... 402
Spermatorrhœa may be due to primary defect of nervous system 730
— or to urethral irritation ... 731
— effects of 732
— treatment 733
Spinal hyperæmia as a cause of paralysis 101
Spinal irritation, views respecting its nature 457, 458
— aggravation of peripheral disorders by pressure on spine explained 459, 460
— good effect of local depletion considered 461
— existence of osteal neuralgia (vertebral) in cases of 464–466
Sternutatories in epilepsy ... 321
Strabismus 391
Strychnia; a cerebral tonic ... 804
— action on uterus and stomach 804
— should always be given in solution 805
Sulphuric acid, action of ... 809

T.

Tannin, action of 809
— useful in epilepsy 325
Tetanus 239
— different views of its causation 239–242
— Lockhart Clarke's and Dickinson's observations ... 239, 242

PAGE
Tetanus, congestion and effusion in cord, how produced 243
— quality of disorder varying ... 245
— bleeding in 248
— antimony in 250
— aconite in 251
— tobacco in 252
— Calabar bean in 255
— opium in 258
— belladonna in 259
— Indian hemp in 260
— woorara in 261
— chloroform and ether in ... 262
— acupuncturation in 263
— tonics and stimulants in ... 263
— warmth and cold in ... 266, 267
— rhythmical inhalation in ... 270
— galvanism in 270
Tetanilla, synonyms 273
— symptoms 274
— treatment 275
Temperature, not always correlated with pulse in fever ... 40
Throat dysæsthesia, cases of 536, 537
Trophic nerves, influence on blood flow 25
Trismus 389
Typhoid fever, spinal symptoms in 153

U.

Unfelt irritation, effects of ... 9
Urethra, neuralgia of 704
— spasmodic stricture persistent 707
Urethritis chronic in females, its relation to neuralgia ... 705
Urinary organs, stammering ... 706
Urticaria 737
— factitious 737
— of reflex origin 739
— case of malarious 739
— diathetic relations of ... 740
— treatment of 741
Uterine neuroses, p. 721; uterine hæmorrhage from apoplexy, p. 721; uterine epistaxis from vaso-motor paralysis, p. 722; uterine neuralgia, simple and rheumatic, pp. 722, 723; irritable uterus, Gr. Hewitt, Ferguson, Mackenzie, on, pp. 724, 725; treatment of, p. 726; neuralgia of cervix uteri, p. 726; menorrhagia, treatment of, p. 726.
Uterus, gravid state of as a cause of cerebral paresis 118

V.

PAGE

Vapour bath, counteracting effect of cold 33
Vaso-motor nerves, results of paralysis of 18
Venery excessive, a cause of cerebral paresis 122
Venous hyperæmia of brain, effects of 68
Vertigo, seat of, p, 438; causative conditions, p. 439; influenza, p. 439; gastric disorder, p. 441; injuries to head, p. 442; heatstroke, p. 443; gout, p. 444; aural disease, p. 444; tænia, p. 445; senility, p. 450.
Vomiting and flatulence cured by faradization 679
Vulva, pruritus of 727

W.

Warmth, moist, effects of ... 828
Weber, Dr. Hermann, on delirium of collapse 174
— on effects of injury to cervical part of cord 231
Winter, influence of, in causing cerebral paresis 112

Y.

Yawning 648

LEEDS SCHOOL OF MEDICINE

ERRATA.

Page 118, line 20, exsanguine *for* sanguine.
„ 143, „ 26, malarious miasm *for* miasm.
„ 162, „ 30, his stay *for* this stage.
„ 198, „ 15, of it in certain cases *for* of it.
„ 276, „ 31, hyperlactation *for* hyperlectation.
„ 438, „ 5, tubercula *for* tubercular.
„ 449, „ 30, attended with morning retching *for* attended Morning retching.
„ 461, „ 10, nerve-roots *for* nerve-root.

PRINTED BY J. E. ADLARD, BARTHOLOMEW CLOSE.

London, New Burlington Street,
January, 1870.

MESSRS. CHURCHILL & SONS'

Publications,

IN

MEDICINE

AND THE VARIOUS BRANCHES OF

NATURAL SCIENCE.

"It would be unjust to conclude this notice without saying a few words in favour of Mr. Churchill, from whom the profession is receiving, it may be truly said, the most beautiful series of Illustrated Medical Works which has ever been published."—*Lancet.*

"All the publications of Mr. Churchill are prepared with so much taste and neatness, that it is superfluous to speak of them in terms of commendation."—*Edinburgh Medical and Surgical Journal.*

"No one is more distinguished for the elegance and *recherché* style of his publications than Mr. Churchill."—*Provincial Medical Journal.*

"The name of Churchill has long been a guarantee for the excellence of illustrated works, and it would be superfluous to repeat the admiration that we have several times expressed in this respect, of the spirit with which this firm engages in these costly but valuable series."—*Medical Press and Circular.*

"The typography, illustrations, and getting up are, in all Mr. Churchill's publications, most beautiful."—*Monthly Journal of Medical Science.*

"Mr. Churchill's illustrated works are among the best that emanate from the Medical Press."—*Medical Times.*

"We have before called the attention of both students and practitioners to the great advantage which Mr. Churchill has conferred on the profession, in the issue, at such a moderate cost, of works so highly creditable in point of artistic execution and scientific merit."—*Dublin Quarterly Journal.*

Messrs. Churchill & Sons are the Publishers of the following Periodicals, offering to Authors a wide extent of Literary Announcement, and a Medium of Advertisement, addressed to all Classes of the Profession.

THE BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW, AND QUARTERLY JOURNAL OF PRACTICAL MEDICINE AND SURGERY.

Price Six Shillings. Nos. I. to LXXXIX.

THE QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE,

Edited by Dr. Lankester, F.R.S., and E. Ray Lankester, B.A., F.R.M.S. Price 4*s.* Nos. I. to XXXVII. *New Series.*

THE JOURNAL OF MENTAL SCIENCE.

By authority of the Medico-Psychological Association.
Edited by C. L. Robertson, M.D., and Henry Maudsley, M.D.
Published Quarterly, price 3*s.* 6*d.* *New Series.* Nos. I. to XXXVI.

JOURNAL OF CUTANEOUS MEDICINE.

Edited by Erasmus Wilson, F.R.S.
Published Quarterly, price 2*s.* 6*d.* Nos. I. to XII.

ARCHIVES OF MEDICINE:

A Record of Practical Observations and Anatomical and Chemical Researches, connected with the Investigation and Treatment of Disease. Edited by Dr. Lionel S. Beale, F.R.S. Published Quarterly; Nos. I. to VIII., 3*s.* 6*d.*; IX. to XII., 2*s.* 6*d.*, XIII. to XVI., 3*s.*

THE ROYAL LONDON OPHTHALMIC HOSPITAL REPORTS, AND JOURNAL OF OPHTHALMIC MEDICINE AND SURGERY.

Vol. VI., Part 4, 2*s.* 6*d.*

THE MEDICAL TIMES & GAZETTE.

Published Weekly, price Sixpence, or Stamped, Sevenpence.

Annual Subscription, £1. 6*s.*, or Stamped, £1. 10*s.* 4*d.*, and regularly forwarded to all parts of the Kingdom.

THE PHARMACEUTICAL JOURNAL,

Containing the Transactions of the Pharmaceutical Society.

Published Monthly, price One Shilling.

⁂ Vols. I. to XXVIII., bound in cloth, price 12*s.* 6*d.* each.

THE BRITISH JOURNAL OF DENTAL SCIENCE.

Published Monthly, price One Shilling. Nos. I. to CLXIII.

THE MEDICAL DIRECTORY.

Published Annually. 8vo. cloth, 10*s.* 6*d.*

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES.

BEING A DIGEST OF BRITISH AND CONTINENTAL MEDICINE,

AND OF THE PROGRESS OF MEDICINE AND THE COLLATERAL SCIENCES.

Edited by W. Domett Stone, M.D., F.R.C.S., L.S.A.

Post 8vo. cloth, 6*s.* 6*d.* Vols. I. to L.

"American physicians may be congratulated that they are once more favoured with the reprint of 'Ranking's Abstract.' If any doctor is so busy that he can read but a single volume a year, then, assuredly, he should make this his book; for here are collected and condensed the most valuable contributions to periodical medical literature—French, German, British, and American—for the year; and, on the other hand, no physician—it matters not how wide the range of his reading—can fail to find, in this volume, truths that will enlarge his medical knowledge, and precepts that will help him in some of his daily professional needs."—*Cincinnati Journal of Medicine*, April, 1867.

"We have only space to say that this volume is rich in valuable articles, among which there are many on materia medica and therapeutics. Gathered from all sources in the new books and medical journals of Europe and America, this work may be viewed as the cream of that class of medical essays, and is a useful occupant of the physician's office-table, to keep him reminded of the progress of medicine." —*American Journal of Pharmacy*, May, 1867.

A CLASSIFIED INDEX

TO

MESSRS. CHURCHILL & SONS' CATALOGUE.

ANATOMY.

	PAGE
Anatomical Remembrancer	7
Flower on Nerves	16
Heale's Anatomy of the Lungs	19
Heath's Practical Anatomy	20
Holden's Human Osteology	20
Do. on Dissections	20
Jones' and Sieveking's Pathological Anatomy	22
MacDougal—Hirschfeld on the Nervous System	v
Maclise's Surgical Anatomy	25
St. Bartholomew's Hospital Catalogue	31
Sibson's Medical Anatomy	33
Waters' Anatomy of Lung	37
Wheeler's Anatomy for Artists	38
Wilson's Anatomy	39

CHEMISTRY.

Bernays' Notes for Students	9
Bloxam's Chemistry	10
Do. Laboratory Teaching	10
Bowman's Practical Chemistry	10
Do. Medical do.	10
Fownes' Manual of Chemistry	16
Do. Actonian Prize	16
Do. Qualitative Analysis	16
Fresenius' Chemical Analysis	17
Galloway's First Step	17
Do. Second Step	17
Do. Analysis	17
Do. Tables	17
Griffiths' Four Seasons	18
Horsley's Chem. Philosophy	21
Mulder on the Chemistry of Wine	27
Plattner & Muspratt on Blowpipe	28
Shuttleworth's Modern Chemistry	32
Speer's Pathol. Chemistry	34
Sutton's Volumetric Analysis	34

CLIMATE.

Bennet's Winter in the South of Europe	9
Chambers on Italy	12
Dalrymple on Egypt	14
Francis on Change of Climate	16
Grabham on Madeira	18
Hall on Torquay	19
Haviland on Climate	19
Horton on West Coast of Africa	21
Lee on Climate	24
Do. Watering Places of England	24
McClelland on Bengal	25
McNicoll on Southport	25
Martin on Tropical Climates	26
Moore's Diseases of India	26
Patterson's Egypt and the Nile	28
Scoresby-Jackson's Climatology	32
Shapter on South Devon	32
Siordet on Mentone	33
Taylor on Pau and Pyrenees	35

DEFORMITIES, &c.

	PAGE
Adams on Spinal Curvature	6
Do. on Clubfoot	6
Bigg's Orthopraxy	9
Bishop on Deformities	10
Do. Articulate Sounds	10
Brodhurst on Spine	11
Do. on Clubfoot	11
Hugman on Hip Joint	21
Salt on Lower Extremities	31

GENERATIVE ORGANS, Diseases of, and SYPHILIS.

Acton on Reproductive Organs	6
Coote on Syphilis	14
Coulson on Syphilis	14
Gant on Bladder	17
Hutchinson on Inherited Syphilis	22
Lee on Syphilis	23
Oppert on Syphilis	27
Parker on Syphilis	27
Wilson on Syphilis	39

HYGIENE.

Armstrong on Naval Hygiene	7
Beale's Laws of Health	8
Carter on Training	12
Chavasse's Advice to a Mother	13
Do. Counsel to do.	13
Do. Advice to a Wife	13
Dobell's Germs and Vestiges of Disease	15
Fife & Urquhart on Turkish Bath	16
Gordon on Army Hygiene	17
Hartwig on Sea Bathing	19
Hartwig on Physical Education	19
Hufeland's Art of prolonging Life	21
Hunter on Body and Mind	21
Lee's Baths of France, Germany, and Switzerland	24
Lowndes on the Maintenance of Health	25
Moore's Health in Tropics	26
Parkes on Hygiene	28
Parkin on Disease	28
Pearse's Notes on Health	28
Pickford on Hygiene	28
Robertson on Diet	34
Routh on Infant Feeding	31
Wells' Seamen's Medicine Chest	38
Wilson on Healthy Skin	39
Do. on Mineral Waters	39
Do. on Turkish Bath	39

MATERIA MEDICA and PHARMACY.

Beasley's Formulary	9
Do. Receipt Book	9
Do. Book of Prescriptions	9

MATERIA MEDICA and PHARMACY—*continued.*

	PAGE
Birch on Oxygen	9
Brunton on Digitalis	11
Flux on Sale of Poisons	16
Lescher's Elements of Pharmacy	24
Nevins' Analysis of Pharmacop.	27
Pereira's Selecta è Præscriptis	28
Prescriber's Pharmacopœia	29
Royle's Materia Medica	31
Squire's Hospital Pharmacopæias	34
Do. Companion to the Pharmacopæia	34
Steggall's First Lines for Chemists and Druggists	34
Stowe's Toxicological Chart	34
Taylor on Poisons	35
Wahltuch's Materia Medica	37
Waring's Therapeutics	37
Wittstein's Pharmacy	39

MEDICINE.

Adams on Rheumatic Gout	6
Addison on Cell Therapeutics	6
Do. on Healthy and Diseased Structure	6
Aldis's Hospital Practice	6
Anderson (Andrew) on Fever	7
Austin on Paralysis	7
Barclay on Medical Diagnosis	8
Do. on Gout	8
Barlow's Practice of Medicine	8
Basham on Dropsy	8
Braidwood on Pyæmia	10
Brinton on Stomach	11
Do. on Intestinal Obstruction	11
Budd on the Liver	11
Budd on Stomach	11
Camplin on Diabetes	12
Catlow on Æsthetic Medicine	12
Chambers on the Indigestions	12
Do. Lectures	12
Cockle on Cancer	13
Dale's Practical Medicine	14
Davey's Ganglionic Nervous Syst.	14
Day's Clinical Histories	15
Elam on Medicine, Disease, and Death	15
Eyre on Stomach	15
Fenwick on the Stomach	16
Do. on Diagnosis	16
Fuller on Rheumatism	16
Gairdner on Gout	17
Gibb on Throat	17
Do. on Laryngoscope	17
Gully's Simple Treatment	18
Habershon on the Abdomen	18
Do. on Mercury	18
Hall (Marshall) on Apnœa	18
Do. Observations	18
Headland—Action of Medicines	19
Do. Medical Handbook	19
Hooper's Physician's Vade-Mecum	18

MEDICINE—*continued.*

PAGE
Inman's New Theory 22
Do. Myalgia.. 22
James on Laryngoscope 22
Jeneken on Cholera 22
Jones (Bence) on Pathology and Therapeutics 22
Maclachlan on Advanced Life.. 25
MacLeod on Alcoholic Diseases.. 25
Macleod's Ben Rhydding 25
Macnamara on Cholera 25
Marcet on Chronic Alcoholism. 25
Macpherson on Cholera 26
Markham on Bleeding 26
Martyn on Hooping Cough .. 26
Morris on Germinal Matter .. 27
Meryon on Paralysis 26
Mushet on Apoplexy.. 27
Nicholson on Yellow Fever .. 27
Parkin on Cholera 28
Pavy on Diabetes 28
Do. on Digestion 28
Roberts on Palsy 31
Robertson on Gout 31
Sansom on Cholera 32
Savory's Domestic Medicine .. 32
Semple on Cough 32
Seymour on Dropsy 32
Shaw's Medical Remembrancer 32
Shrimpton on Cholera 32
Smee on Debility 33
Steggall's Medical Manual .. 34
Thomas' Practice of Physic .. 35
Thudichum on Gall Stones .. 35
Todd's Clinical Lectures 36
Tweedie on Continued Fevers 36
Walker on Diphtheria 37
What to Observe at the Bedside 25
Williams' Principles 38
Wright on Headaches 39

MICROSCOPE.

Beale on Microscope in Medicine 8
Carpenter on Microscope 12
Schacht on do. 32

MISCELLANEOUS.

Acton on Prostitution 6
Barclay's Medical Errors 8
Bascome on Epidemics 8
Buckle's Hospital Statistics .. 11
Cooley's Cyclopædia 13
Edwards' Photographs 15
Gordon on China 17
Graves' Physiology and Medicine 17
Guy's Hospital Reports 17
Harrison on Lead in Water .. 19
Hingeston's Topics of the Day.. 20
Howe on Epidemics 21
Lane's Hydropathy 23
Lee on Homœop. and Hydrop 24
London Hospital Reports.. .. 24
Mayne's Medical Vocabulary .. 26
Oppert on Hospitals 27
Part's Case Book 28
Redwood's Supplement to Pharmacopœia 30
Ryan on Infanticide 31
St. George's Hospital Reports .. 31
Simms' Winter in Paris 33
Snow on Chloroform.. 33
Waring's Tropical Resident at Home 37
Whitehead on Transmission .. 38
Wise's Med. amongst Asiatics .. 38

NERVOUS DISORDERS AND INDIGESTION.

PAGE
Althaus on Epilepsy, Hysteria, &c. 7
Birch on Constipation 9
Carter on Hysteria 12
Downing on Neuralgia 15
Hunt on Heartburn 21
Jones (Handfield) on Functional Nervous Disorders.. 22
Leared on Imperfect Digestion 23
Lobb on Nervous Affections .. 24
Morris on Irritability.. 26
Reade on Syphilitic Affections of the Nervous System 30
Reynolds on the Brain 30
Do. on Epilepsy 30
Rowe on Nervous Diseases .. 31
Sieveking on Epilepsy 33
Turnbull on Stomach 36

OBSTETRICS.

Barnes on Obstetric Operations 8
Hodges on Puerperal Convulsions 20
Lee's Clinical Midwifery 24
Do. Consultations 24
Leishman's Mechanism of Parturition 24
Pretty's Aids during Labour .. 29
Priestley on Gravid Uterus .. 30
Ramsbotham's Obstetrics.. .. 30
Sinclair & Johnston's Midwifery 33
Smellie's Obstetric Plates.. .. 33
Smith's Manual of Obstetrics .. 33
Swayne's Aphorisms 34
Waller's Midwifery 37

OPHTHALMOLOGY.

Cooper on Injuries of Eye .. 13
Do. on Near Sight 13
Dalrymple on Eye 14
Dixon on the Eye 15
Hogg on Ophthalmoscope .. 20
Hulke on the Ophthalmoscope 21
Jago on Entoptics 22
Jones' Ophthalmic Medicine .. 23
Do. Defects of Sight 23
Do. Eye and Ear 23
Macnamara on the Eye 25
Nunneley on the Organs of Vision 27
Power's Illustrations of Diseases of the Eye 29
Solomon on Glaucoma 33
Walton on the Eye 37
Wells Treatise on the Eye .. 38
Do. on Spectacles 38
Wolfe on Cataract 39

PHYSIOLOGY.

Beale on Protoplasm.. 8
Carpenter's Human 12
Do. Manual 12
Heale on Vital Causes 19
Richardson on Coagulation .. 30
Shea's Animal Physiology 32
Virchow's (ed. by Chance) Cellular Pathology 12

PSYCHOLOGY.

PAGE
Arlidge on the State of Lunacy 7
Bucknill and Tuke's Psychological Medicine 11
Davey on Nature of Insanity .. 14
Hood on Criminal Lunatics .. 21
Murray on Emotional Diseases 27
Noble on Mind 27
Sankey on Mental Diseases .. 31
Van der Kolk on Mental Disease 37
Winslow's Obscure Dis. of Brain 39

PULMONARY and CHEST DISEASES, &c.

Alison on Pulmonary Consumption 6
Bright on the Chest 10
Cotton on Stethoscope 14
Davies on Lungs and Heart .. 14
Dobell on the Chest 15
Do. on Tuberculosis 15
Do. on Winter Cough 15
Do. First Stage of Consumption 15
Fuller on the Lungs 16
Do. on Heart 16
Jones (Jas.) on Consumption .. 23
Laennec on Auscultation 23
Markham on Heart 26
Peacock on the Heart 28
Pirrie on Hay Asthma 29
Salter on Asthma 31
Skoda on Auscultation 26
Thompson on Consumption .. 35
Thorowgood on Asthma 35
Timms on Consumption 36
Turnbull on Consumption .. 36
Waters on the Chest.. 37
Do. on Emphysema 37

RENAL and URINARY DISEASES.

Acton on Urinary Organs .. 6
Beale on Kidney Diseases .. 8
Bird's Urinary Deposits 10
Coulson on Bladder 14
Hassall on Urine 19
Parkes on Urine.. 28
Thudichum on Urine 35
Todd on Urinary Organs 36

SCIENCE.

Baxter on Organic Polarity .. 8
Bentley's Manual of Botany .. 9
Brooke's Natural Philosophy .. 11
Hardwich's Photography 19
Hinds' Harmonies 20
Howard on the Clouds 21
Huxley on Classification of Animals 22
Jones (Bence) on Matter and Force 22
Jones (Wharton) on Vision .. 23
Do. on Body, Sense, and Mind 23
Mayne's Lexicon of Terms .. 26
Noad on the Inductorium .. 27

SCIENCE—*continued.*

PAGE
Pratt's Genealogy of Creation .. 29
Do. Eccentric & Centric Force 29
Do. on Orbital Motion 29
Do. Astronomical Investigations 29
Do. Oracles of God 29
Price's Photography 30
Rainey on Shells 30
Reymond's Animal Electricity 30
Taylor's Medical Jurisprudence 35
Vestiges of Creation 36

SURGERY.

Adams on Reparation of Tendons 6
Do. Subcutaneous Surgery 6
Anderson on the Skin 7
Ashton on Rectum 7
Brodhurst on Anchylosis 11
Bryant on Diseases of Joints .. 11
Do. Clinical Surgery .. 11
Callender on Rupture 12
Chapman on Ulcers 12
Do. Varicose Veins 12
Clark on Visceral Lesions .. 13
Do. Outlines of Surgery 13
Collis on Cancer 13
Cooper (Sir A.) on Testis 13
Do. (S.) Surg. Dictionary 14
Coulson on Stone in Bladder .. 14
Curling on Rectum 14
Do. on Testis 14
Druitt's Surgeon's Vade-Mecum 15
Fayrer's Clinical Surgery .. 15
Fergusson's Surgery 16
Do. Progress of Surgery 16
Gamgee's Amputation at Hip-joint 17

SURGERY—*continued.*

PAGE
Gant's Principles of Surgery .. 17
Gay on Varicose Disease 17
Heath's Minor Surgery and Bandaging 20
Do. on the Jaws 20
Higginbottom on Nitrate of Silver 20
Hodgson on Prostate 20
Holt on Stricture 21
Lawrence's Surgery 23
Do. Ruptures 23
Lee on the Rectum, &c. 23
Liston's Surgery 24
Logan on Skin Diseases 24
Macleod's Surgical Diagnosis .. 25
Macleod's Surgery of the Crimea 25
Maclise on Fractures 25
Marsden on Cancer 26
Maunder's Operative Surgery .. 26
Nayler on Skin Diseases 27
Nunneley on Erysipelas 27
Pirrie's Surgery 29
Pirrie & Keith on Acupressure 29
Price on Excision of Knee-joint 29
Ramsay and Coles on Deformities of the Mouth 30
Sansom on Chloroform 32
Smith (Hy.) on Stricture 33
Do. on Hæmorrhoids 33
Do. on the Surgery of the Rectum 33
Do. (Dr. J.) Dental Anatomy and Surgery 33
Spender on Ulcers 34
Steggall's Surgical Manual .. 34
Swain on the Knee-Joint 34
Thompson on Stricture 35
Do. on Prostate 35
Do. Lithotomy and Lithotrity 35
Do. on Urinary Organs 35

SURGERY—*continued.*

PAGE
Tomes' Dental Surgery 36
Wade on Stricture 37
Webb's Surgeon's Ready Rules 37
Wilson on Skin Diseases 39
Do. Portraits of Skin Diseases 39
Yearsley on Deafness 39
Do. on Throat 39

VETERINARY MEDICINE.

Blaine's Veterinary Art 10
Bourguignon on the Cattle Plague 10
Haycock on Shoeing Horses .. 19
Tuson's Pharmacopœia 36

WOMEN AND CHILDREN, Diseases of.

Ballard on Infants and Mothers 7
Bennet on Uterus 9
Ellis on Children 15
Eyre's Practical Remarks .. 15
Harrison on Children 19
Hood on Scarlet Fever, &c. .. 21
Kiwisch (ed. by Clay) on Ovaries 15
Lee's Ovarian & Uterine Diseases 24
Do. on Speculum 24
Ritchie on Ovaries 31
Seymour on Ovaria 32
Tilt on Uterine Inflammation .. 36
Do. Uterine Therapeutics .. 36
Do. on Change of Life 36
Underwood on Children 36
West on Women 38
Wright on Uterine Disorders .. 39

TO BE COMPLETED IN TWELVE PARTS, 4TO., AT 7*s.* 6*d.* PER PART.

PARTS I. & II. NOW READY.

A DESCRIPTIVE TREATISE
ON THE
NERVOUS SYSTEM OF MAN,
WITH THE MANNER OF DISSECTING IT.

BY LUDOVIC HIRSCHFELD,

DOCTOR OF MEDICINE OF THE UNIVERSITIES OF PARIS AND WARSAW, PROFESSOR OF ANATOMY TO THE FACULTY OF MEDICINE OF WARSAW;

Edited in English (from the French Edition of 1866*)*

BY ALEXANDER MASON MACDOUGAL, F.R.C.S.,

WITH

AN ATLAS OF ARTISTICALLY-COLOURED ILLUSTRATIONS,

Embracing the Anatomy of the entire Cerebro-Spinal and Sympathetic Nervous Centres and Distributions in their accurate relations with all the important Constituent Parts of the Human Economy, and embodied in a series of 56 Single and 9 Double Plates, comprising 197 Illustrations,

Designed from Dissections prepared by the Author, and Drawn on Stone by

J. B. LÉVEILLÉ.

MR. ACTON, M.R.C.S.

I.

A PRACTICAL TREATISE ON DISEASES OF THE URINARY AND GENERATIVE ORGANS IN BOTH SEXES. Third Edition. 8vo. cloth, £1. 1*s*. With Plates, £1. 11*s*. 6*d*. The Plates alone, limp cloth, 10*s*. 6*d*.

II.

THE FUNCTIONS AND DISORDERS OF THE REPRODUCTIVE ORGANS IN CHILDHOOD, YOUTH, ADULT AGE, AND ADVANCED LIFE, considered in their Physiological, Social, and Moral Relations. Fourth Edition. 8vo. cloth, 10*s*. 6*d*.

III.

PROSTITUTION: Considered in its Moral, Social, and Sanitary Aspects, Second Edition, enlarged. 8vo. cloth, 12*s*.

DR. ADAMS, A.M.

A TREATISE ON RHEUMATIC GOUT; OR, CHRONIC RHEUMATIC ARTHRITIS. 8vo. cloth, with a Quarto Atlas of Plates, 21*s*.

MR. WILLIAM ADAMS, F.R.C.S.

I.

ON THE PATHOLOGY AND TREATMENT OF LATERAL AND OTHER FORMS OF CURVATURE OF THE SPINE. With Plates. 8vo. cloth, 10*s*. 6*d*.

II.

CLUBFOOT: its Causes, Pathology, and Treatment. Jacksonian Prize Essay for 1864. With 100 Engravings. 8vo. cloth, 12*s*.

III.

ON THE REPARATIVE PROCESS IN HUMAN TENDONS AFTER SUBCUTANEOUS DIVISION FOR THE CURE OF DEFORMITIES. With Plates. 8vo. cloth, 6*s*.

IV.

SKETCH OF THE PRINCIPLES AND PRACTICE OF SUBCUTANEOUS SURGERY. 8vo. cloth, 2*s*. 6*d*.

DR. WILLIAM ADDISON, F.R.S.

I.

CELL THERAPEUTICS. 8vo. cloth, 4*s*.

II.

ON HEALTHY AND DISEASED STRUCTURE, AND THE TRUE PRINCIPLES OF TREATMENT FOR THE CURE OF DISEASE, ESPECIALLY CONSUMPTION AND SCROFULA, founded on MICROSCOPICAL ANALYSIS. 8vo. cloth, 12*s*.

DR. ALDIS.

AN INTRODUCTION TO HOSPITAL PRACTICE IN VARIOUS COMPLAINTS; with Remarks on their Pathology and Treatment. 8vo. cloth, 5*s*. 6*d*.

DR. SOMERVILLE SCOTT ALISON, M.D.EDIN., F.R.C.P.

THE PHYSICAL EXAMINATION OF THE CHEST IN PULMONARY CONSUMPTION, AND ITS INTERCURRENT DISEASES. With Engravings. 8vo. cloth, 12*s*.

DR. ALTHAUS, M.D., M.R.C.P.

ON EPILEPSY, HYSTERIA, AND ATAXY. Cr. 8vo. cloth, 4*s*.

THE ANATOMICAL REMEMBRANCER; OR, COMPLETE
POCKET ANATOMIST. Sixth Edition, carefully Revised. 32mo. cloth, 3*s*. 6*d*.

DR. McCALL ANDERSON, M.D.

I.

THE PARASITIC AFFECTIONS OF THE SKIN. Second
Edition. With Engravings. 8vo. cloth, 7*s*. 6*d*.

II.

ECZEMA. Second Edition. 8vo. cloth, 6*s*.

III.

PSORIASIS AND LEPRA. With Chromo-lithograph. 8vo. cloth, 5*s*.

DR. ANDREW ANDERSON, M.D.

TEN LECTURES INTRODUCTORY TO THE STUDY OF FEVER.
Post 8vo. cloth, 5*s*.

DR. ARLIDGE.

ON THE STATE OF LUNACY AND THE LEGAL PROVISION
FOR THE INSANE; with Observations on the Construction and Organisation of Asylums. 8vo. cloth, 7*s*.

DR. ALEXANDER ARMSTRONG, R.N.

OBSERVATIONS ON NAVAL HYGIENE AND SCURVY.
More particularly as the latter appeared during a Polar Voyage. 8vo. cloth, 5*s*.

MR. T. J. ASHTON.

I.

ON THE DISEASES, INJURIES, AND MALFORMATIONS
OF THE RECTUM AND ANUS. Fourth Edition. 8vo. cloth, 8*s*.

II.

PROLAPSUS, FISTULA IN ANO, AND HÆMORRHOIDAL
AFFECTIONS; their Pathology and Treatment. Second Edition. Post 8vo. cloth 2*s*. 6*d*.

MR. THOS. J. AUSTIN, M.R.C.S.ENG.

A PRACTICAL ACCOUNT OF GENERAL PARALYSIS:
Its Mental and Physical Symptoms, Statistics, Causes, Seat, and Treatment. 8vo. cloth, 6*s*.

DR. THOMAS BALLARD, M.D.

A NEW AND RATIONAL EXPLANATION OF THE DISEASES PECULIAR TO INFANTS AND MOTHERS;
with obvious Suggestions for their Prevention and Cure. Post 8vo. cloth, 4*s*. 6*d*.

DR. BARCLAY.

I.

A MANUAL OF MEDICAL DIAGNOSIS. Second Edition. Foolscap 8vo. cloth, 8*s.* 6*d.*

II.

MEDICAL ERRORS.—Fallacies connected with the Application of the Inductive Method of Reasoning to the Science of Medicine. Post 8vo. cloth, 5*s.*

III.

GOUT AND RHEUMATISM IN RELATION TO DISEASE OF THE HEART. Post 8vo. cloth, 5*s.*

* * *

DR. BARLOW.

A MANUAL OF THE PRACTICE OF MEDICINE. Second Edition. Fcap. 8vo. cloth, 12*s.* 6*d.*

* * *

DR. BARNES, M.D., F.R.C.P.

LECTURES ON OBSTETRIC OPERATIONS, INCLUDING THE TREATMENT OF HÆMORRHAGE, and forming a Guide to the Management of Difficult Labour. With nearly 100 Engravings. 8vo. cloth, 15*s.*

* * *

DR. BASCOME.

A HISTORY OF EPIDEMIC PESTILENCES, FROM THE EARLIEST AGES. 8vo. cloth, 8*s.*

* * *

DR. BASHAM.

ON DROPSY, AND ITS CONNECTION WITH DISEASES OF THE KIDNEYS, HEART, LUNGS AND LIVER. With 16 Plates. Third Edition. 8vo. cloth, 12*s.* 6*d.*

* * *

MR. H. F. BAXTER, M.R.C.S.L.

ON ORGANIC POLARITY; showing a Connexion to exist between Organic Forces and Ordinary Polar Forces. Crown 8vo. cloth, 5*s.*

* * *

MR. LIONEL J. BEALE, M.R.C.S.

THE LAWS OF HEALTH IN THEIR RELATIONS TO MIND AND BODY. A Series of Letters from an Old Practitioner to a Patient. Post 8vo. cloth, 7*s.* 6*d.*

* * *

DR. BEALE, F.R.S.

I.

ON KIDNEY DISEASES, URINARY DEPOSITS, AND CALCULOUS DISORDERS. Third Edition, much Enlarged. With 70 Plates. 8vo. cloth, 25*s.*

II.

THE MICROSCOPE, IN ITS APPLICATION TO PRACTICAL MEDICINE. Third Edition. With 58 Plates. 8vo. cloth, 16*s.*

III.

PROTOPLASM; OR, LIFE, FORCE, AND MATTER. Second Edition. With 8 Plates. Crown 8vo. cloth, 6*s.* 6*d.*

MR. BEASLEY.

I.

THE BOOK OF PRESCRIPTIONS; containing 3000 Prescriptions. Collected from the Practice of the most eminent Physicians and Surgeons, English and Foreign. Third Edition. 18mo. cloth, 6*s.*

II.

THE DRUGGIST'S GENERAL RECEIPT-BOOK: comprising a copious Veterinary Formulary and Table of Veterinary Materia Medica; Patent and Proprietary Medicines, Druggists' Nostrums, &c.; Perfumery, Skin Cosmetics, Hair Cosmetics, and Teeth Cosmetics; Beverages, Dietetic Articles, and Condiments; Trade Chemicals, Miscellaneous Preparations and Compounds used in the Arts, &c.; with useful Memoranda and Tables. Sixth Edition. 18mo. cloth, 6*s.*

III.

THE POCKET FORMULARY AND SYNOPSIS OF THE BRITISH AND FOREIGN PHARMACOPŒIAS; comprising standard and approved Formulæ for the Preparations and Compounds employed in Medical Practice. Eighth Edition, corrected and enlarged. 18mo. cloth, 6*s.*

* * *

DR. HENRY BENNET.

I.

A PRACTICAL TREATISE ON UTERINE DISEASES. Fourth Edition, revised, with Additions. 8vo. cloth, 16*s.*

II.

WINTER AND SPRING ON THE SHORES OF THE MEDITERRANEAN: OR, THE RIVIERA, MENTONE, ITALY, CORSICA, SICILY, ALGERIA, SPAIN, AND BIARRITZ, AS WINTER CLIMATES. Fourth Edition, with numerous Plates, Maps, and Wood Engravings. Post 8vo. cloth, 12*s.*

* * *

PROFESSOR BENTLEY, F.L.S.

A MANUAL OF BOTANY. With nearly 1,200 Engravings on Wood. Fcap. 8vo. cloth, 12*s.* 6*d.*

* * *

DR. BERNAYS.

NOTES FOR STUDENTS IN CHEMISTRY; being a Syllabus compiled from the Manuals of Miller, Fownes, Berzelius, Gerhardt, Gorup-Besanez, &c. Fourth Edition. Fcap. 8vo. cloth, 3*s.*

* * *

MR. HENRY HEATHER BIGG.

ORTHOPRAXY: a complete Guide to the Modern Treatment of Deformities by Mechanical Appliances. With 300 Engravings. Second Edition. Post 8vo. cloth, 10*s.*

* * *

DR. S. B. BIRCH, M.D., M.R.C.P.

I.

OXYGEN: ITS ACTION, USE, AND VALUE IN THE TREATMENT OF VARIOUS DISEASES OTHERWISE INCURABLE OR VERY INTRACTABLE. Second Edition. Post 8vo. cloth, 3*s.* 6*d.*

II.

CONSTIPATED BOWELS: the Various Causes and the Different Means of Cure. Third Edition. Post 8vo. cloth, 3*s.* 6*d.*

DR. GOLDING BIRD, F.R.S.

URINARY DEPOSITS; THEIR DIAGNOSIS, PATHOLOGY, AND THERAPEUTICAL INDICATIONS. With Engravings. Fifth Edition. Edited by E. LLOYD BIRKETT, M.D. Post 8vo. cloth, 10*s.* 6*d.*

MR. BISHOP, F.R.S.

I.

ON DEFORMITIES OF THE HUMAN BODY, their Pathology and Treatment. With Engravings on Wood. 8vo. cloth, 10*s.*

II.

ON ARTICULATE SOUNDS, AND ON THE CAUSES AND CURE OF IMPEDIMENTS OF SPEECH. 8vo. cloth, 4*s.*

MR. BLAINE.

OUTLINES OF THE VETERINARY ART; OR, A TREATISE ON THE ANATOMY, PHYSIOLOGY, AND DISEASES OF THE HORSE, NEAT CATTLE, AND SHEEP. Seventh Edition. By Charles Steel, M.R.C.V.S.L. With Plates. 8vo. cloth, 18*s.*

MR. BLOXAM.

I.

CHEMISTRY, INORGANIC AND ORGANIC; with Experiments and a Comparison of Equivalent and Molecular Formulæ. With 276 Engravings on Wood. 8vo. cloth, 16*s.*

II.

LABORATORY TEACHING; OR PROGRESSIVE EXERCISES IN PRACTICAL CHEMISTRY. With 89 Engravings. Crown, 8vo. cloth, 5*s.* 6*d.*

DR. BOURGUIGNON.

ON THE CATTLE PLAGUE; OR, CONTAGIOUS TYPHUS IN HORNED CATTLE: its History, Origin, Description, and Treatment. Post 8vo. 5*s.*

MR. JOHN E. BOWMAN, & MR. C. L. BLOXAM.

I.

PRACTICAL CHEMISTRY, including Analysis. With numerous Illustrations on Wood. Fifth Edition. Foolscap 8vo. cloth, 6*s.* 6*d.*

II.

MEDICAL CHEMISTRY; with Illustrations on Wood. Fourth Edition, carefully revised. Fcap. 8vo. cloth, 6*s.* 6*d.*

DR. BRAIDWOOD, M.D. EDIN.

ON PYÆMIA, OR SUPPURATIVE FEVER: the Astley Cooper Prize Essay for 1868. With 12 Plates. 8vo. cloth, 10*s.* 6*d.*

DR. JAMES BRIGHT.

ON DISEASES OF THE HEART, LUNGS, & AIR PASSAGES; with a Review of the several Climates recommended in these Affections. Third Edition. Post 8vo. cloth, 9*s.*

DR. BRINTON, F.R.S.

I.

THE DISEASES OF THE STOMACH, with an Introduction on its Anatomy and Physiology; being Lectures delivered at St. Thomas's Hospital. Second Edition. 8vo. cloth, 10*s.* 6*d.*

II.

INTESTINAL OBSTRUCTION. Edited by DR. BUZZARD. Post 8vo. cloth, 5*s.*

MR. BERNARD E. BRODHURST, F.R.C.S.

I.

CURVATURES OF THE SPINE: their Causes, Symptoms, Pathology, and Treatment. Second Edition. Roy. 8vo. cloth, with Engravings, 7*s.* 6*d.*

II.

ON THE NATURE AND TREATMENT OF CLUBFOOT AND ANALOGOUS DISTORTIONS involving the TIBIO-TARSAL ARTICULATION. With Engravings on Wood. 8vo. cloth, 4*s.* 6*d.*

III.

PRACTICAL OBSERVATIONS ON THE DISEASES OF THE JOINTS INVOLVING ANCHYLOSIS, and on the TREATMENT for the RESTORATION of MOTION. Third Edition, much enlarged, 8vo. cloth, 4*s.* 6*d.*

MR BROOKE, M.A., M.B., F.R.S.

ELEMENTS OF NATURAL PHILOSOPHY. Based on the Work of the late Dr. Golding Bird. Sixth Edition. With 700 Engravings. Fcap. 8vo. cloth, 12*s.* 6*d.*

DR. T. L. BRUNTON, B.SC., M.B.

ON DIGITALIS. With some Observations on the Urine. Fcap. 8vo. cloth, 4*s.* 6*d.*

MR. THOMAS BRYANT, F.R.C.S.

I.

ON THE DISEASES AND INJURIES OF THE JOINTS. CLINICAL AND PATHOLOGICAL OBSERVATIONS. Post 8vo. cloth, 7*s.* 6*d.*

II.

CLINICAL SURGERY. Parts I. to VII. 8vo., 3*s.* 6*d.* each.

DR. BUCKLE, M.D., L.R.C.P.LOND.

VITAL AND ECONOMICAL STATISTICS OF THE HOSPITALS, INFIRMARIES, &c., OF ENGLAND AND WALES. Royal 8vo. 5*s.*

DR. JOHN CHARLES BUCKNILL, F.R.S., & DR. DANIEL H. TUKE.

A MANUAL OF PSYCHOLOGICAL MEDICINE: containing the History, Nosology, Description, Statistics, Diagnosis, Pathology, and Treatment of Insanity. Second Edition. 8vo. cloth, 15*s.*

DR. BUDD, F.R.S.

I.

ON DISEASES OF THE LIVER.

Illustrated with Coloured Plates and Engravings on Wood. Third Edition. 8vo. cloth, 16*s.*

II.

ON THE ORGANIC DISEASES AND FUNCTIONAL DISORDERS OF THE STOMACH. 8vo. cloth, 9*s.*

MR. CALLENDER, F.R.C.S.

FEMORAL RUPTURE: Anatomy of the Parts concerned. With Plates. 8vo. cloth, 4*s.*

DR. JOHN M. CAMPLIN, F.L.S.

ON DIABETES, AND ITS SUCCESSFUL TREATMENT. Third Edition, by Dr. Glover. Fcap. 8vo. cloth, 3*s.* 6*d.*

MR. ROBERT B. CARTER, M.R.C.S.

I.

ON THE INFLUENCE OF EDUCATION AND TRAINING IN PREVENTING DISEASES OF THE NERVOUS SYSTEM. Fcap. 8vo., 6*s.*

II.

THE PATHOLOGY AND TREATMENT OF HYSTERIA. Post 8vo. cloth, 4*s.* 6*d.*

DR. CARPENTER, F.R.S.

I.

PRINCIPLES OF HUMAN PHYSIOLOGY. With nearly 300 Illustrations on Steel and Wood. Seventh Edition. Edited by Mr. Henry Power. 8vo. cloth, 28*s.*

II.

A MANUAL OF PHYSIOLOGY. With 252 Illustrations on Steel and Wood. Fourth Edition. Fcap. 8vo. cloth, 12*s.* 6*d.*

III.

THE MICROSCOPE AND ITS REVELATIONS. With more than 400 Engravings on Steel and Wood. Fourth Edition. Fcap. 8vo. cloth, 12*s.* 6*d.*

MR. JOSEPH PEEL CATLOW, M.R.C.S.

ON THE PRINCIPLES OF ÆSTHETIC MEDICINE; or the Natural Use of Sensation and Desire in the Maintenance of Health and the Treatment of Disease. 8vo. cloth, 9*s.*

DR. CHAMBERS.

I.

LECTURES, CHIEFLY CLINICAL. Fourth Edition. 8vo. cloth, 14*s.*

II.

THE INDIGESTIONS OR DISEASES OF THE DIGESTIVE ORGANS FUNCTIONALLY TREATED. Second Edition. 8vo. cloth, 10*s.* 6*d.*

III.

SOME OF THE EFFECTS OF THE CLIMATE OF ITALY. Crown 8vo. cloth, 4*s.* 6*d.*

DR. CHANCE, M.B.

VIRCHOW'S CELLULAR PATHOLOGY, AS BASED UPON PHYSIOLOGICAL AND PATHOLOGICAL HISTOLOGY. With 144 Engravings on Wood. 8vo. cloth, 16*s.*

MR. H. T. CHAPMAN, F.R.C.S.

I.

THE TREATMENT OF OBSTINATE ULCERS AND CUTANEOUS ERUPTIONS OF THE LEG WITHOUT CONFINEMENT. Third Edition. Post 8vo. cloth, 3*s.* 6*d.*

II.

VARICOSE VEINS: their Nature, Consequences, and Treatment, Palliative and Curative. Second Edition. Post 8vo. cloth, 3*s.* 6*d.*

MR. PYE HENRY CHAVASSE, F.R.C.S.

I.

ADVICE TO A MOTHER ON THE MANAGEMENT OF HER CHILDREN. Ninth Edition. Foolscap 8vo., 2*s.* 6*d.*

II.

COUNSEL TO A MOTHER: being a Continuation and the Completion of "Advice to a Mother." Fcap. 8vo. 2*s.* 6*d.*

III.

ADVICE TO A WIFE ON THE MANAGEMENT OF HER OWN HEALTH. With an Introductory Chapter, especially addressed to a Young Wife. Eighth Edition. Fcap. 8vo., 2*s.* 6*d.*

MR. LE GROS CLARK, F.R.C.S.

I.

LECTURES ON THE PRINCIPLES OF SURGICAL DIAGNOSIS: ESPECIALLY IN RELATION TO SHOCK AND VISCERAL LESIONS. Delivered at the Royal College of Surgeons. 8vo. cloth, 10*s.* 6*d.*

II.

OUTLINES OF SURGERY; being an Epitome of the Lectures on the Principles and the Practice of Surgery delivered at St. Thomas's Hospital. Fcap. 8vo. cloth, 5*s.*

MR. JOHN CLAY, M.R.C.S.

KIWISCH ON DISEASES OF THE OVARIES: Translated, by permission, from the last German Edition of his Clinical Lectures on the Special Pathology and Treatment of the Diseases of Women. With Notes, and an Appendix on the Operation of Ovariotomy. Royal 12mo. cloth, 16*s.*

DR. COCKLE, M.D.

ON INTRA-THORACIC CANCER. 8vo. 6*s.* 6*d.*

MR. COLLIS, M.B.DUB., F.R.C.S.I.

THE DIAGNOSIS AND TREATMENT OF CANCER AND THE TUMOURS ANALOGOUS TO IT. With coloured Plates. 8vo. cloth, 14*s.*

MR. COOLEY.

COMPREHENSIVE SUPPLEMENT TO THE PHARMACOPŒIAS.

THE CYCLOPÆDIA OF PRACTICAL RECEIPTS, PROCESSES, AND COLLATERAL INFORMATION IN THE ARTS, MANUFACTURES, PROFESSIONS, AND TRADES, INCLUDING MEDICINE, PHARMACY, AND DOMESTIC ECONOMY; designed as a General Book of Reference for the Manufacturer, Tradesman, Amateur, and Heads of Families. Fourth and greatly enlarged Edition, 8vo. cloth, 28*s.*

MR. W. WHITE COOPER.

I.

ON WOUNDS AND INJURIES OF THE EYE. Illustrated by 17 Coloured Figures and 41 Woodcuts. 8vo. cloth, 12*s.*

II.

ON NEAR SIGHT, AGED SIGHT, IMPAIRED VISION, AND THE MEANS OF ASSISTING SIGHT. With 31 Illustrations on Wood. Second Edition. Fcap. 8vo. cloth, 7*s.* 6*d.*

SIR ASTLEY COOPER, BART., F.R.S.

ON THE STRUCTURE AND DISEASES OF THE TESTIS. With 24 Plates. Second Edition. Royal 4to., 20*s.*

MR. COOPER.

A DICTIONARY OF PRACTICAL SURGERY AND ENCYCLOPÆDIA OF SURGICAL SCIENCE. New Edition, brought down to the present time. By Samuel A. Lane, F.R.C.S., assisted by various eminent Surgeons. Vol. I., 8vo. cloth, £1. 5*s.*

MR. HOLMES COOTE, F.R.C.S.

A REPORT ON SOME IMPORTANT POINTS IN THE TREATMENT OF SYPHILIS. 8vo. cloth, 5*s.*

DR. COTTON, M.D., F.R.C.P.

PHTHISIS AND THE STETHOSCOPE; or, THE PHYSICAL SIGNS OF CONSUMPTION. Fourth Edition. Foolscap 8vo. cloth, 3*s.* 6*d.*

MR. COULSON.

ON DISEASES OF THE BLADDER AND PROSTATE GLAND. New Edition, revised. *In Preparation.*

MR. WALTER COULSON, F.R.C.S.

I.

A TREATISE ON SYPHILIS. 8vo. cloth, 10*s.*

II.

STONE IN THE BLADDER: Its Prevention, Early Symptoms, and Treatment by Lithotrity. 8vo. cloth, 6*s.*

MR. CURLING, F.R.S.

I.

OBSERVATIONS ON DISEASES OF THE RECTUM. Third Edition. 8vo. cloth, 7*s.* 6*d.*

II.

A PRACTICAL TREATISE ON DISEASES OF THE TESTIS, SPERMATIC CORD, AND SCROTUM. Third Edition, with Engravings. 8vo. cloth, 16*s.*

DR. WILLIAM DALE, M.D.LOND.

A COMPENDIUM OF PRACTICAL MEDICINE AND MORBID ANATOMY. With Plates, 12mo. cloth, 7*s.*

DR. DALRYMPLE, M.R.C.P., F.R.C.S.

THE CLIMATE OF EGYPT: METEOROLOGICAL AND MEDICAL OBSERVATIONS, with Practical Hints for Invalid Travellers. Post 8vo. cloth, 4*s.*

MR. JOHN DALRYMPLE, F.R.S., F.R.C.S.

PATHOLOGY OF THE HUMAN EYE. Complete in Nine Fasciculi: imperial 4to., 20*s.* each; half-bound morocco, gilt tops, 9*l.* 15*s.*

DR. HERBERT DAVIES.

ON THE PHYSICAL DIAGNOSIS OF DISEASES OF THE LUNGS AND HEART. Second Edition. Post 8vo. cloth, 8*s.*

DR. DAVEY.

I.

THE GANGLIONIC NERVOUS SYSTEM: its Structure, Functions, and Diseases. 8vo. cloth, 9*s.*

II.

ON THE NATURE AND PROXIMATE CAUSE OF INSANITY. Post 8vo. cloth, 3*s.*

DR. HENRY DAY, M.D., M.R.C.P.

CLINICAL HISTORIES; with Comments. 8vo. cloth, 7*s.* 6*d.*

MR. DIXON.

A GUIDE TO THE PRACTICAL STUDY OF DISEASES OF THE EYE. Third Edition. Post 8vo. cloth, 9*s.*

DR. DOBELL.

I.

DEMONSTRATIONS OF DISEASES IN THE CHEST, AND THEIR PHYSICAL DIAGNOSIS. With Coloured Plates. 8vo. cloth, 12*s.* 6*d.*

II.

LECTURES ON THE GERMS AND VESTIGES OF DISEASE, and on the Prevention of the Invasion and Fatality of Disease by Periodical Examinations. 8vo. cloth, 6*s.* 6*d.*

III.

ON TUBERCULOSIS: ITS NATURE, CAUSE, AND TREATMENT; with Notes on Pancreatic Juice. Second Edition. Crown 8vo. cloth, 3*s.* 6*d.*

IV.

LECTURES ON WINTER COUGH (CATARRH, BRONCHITIS, EMPHYSEMA, ASTHMA); with an Appendix on some Principles of Diet in Disease. Post 8vo. cloth, 5*s.* 6*d.*

V.

LECTURES ON THE TRUE FIRST STAGE OF CONSUMPTION. Crown 8vo. cloth, 3*s.* 6*d.*

DR. TOOGOOD DOWNING.

NEURALGIA: its various Forms, Pathology, and Treatment. The Jacksonian Prize Essay for 1850. 8vo. cloth, 10*s.* 6*d.*

DR. DRUITT, F.R.C.S.

THE SURGEON'S VADE-MECUM; with numerous Engravings on Wood. Ninth Edition. Foolscap 8vo. cloth, 12*s.* 6*d.*

MR. ERNEST EDWARDS, B.A.

PHOTOGRAPHS OF EMINENT MEDICAL MEN, with brief Analytical Notices of their Works. Vols. I. and II. (24 Portraits), 4to. cloth, 24*s.* each.

DR. ELAM, M.D.

MEDICINE, DISEASE, AND DEATH: being an Enquiry into the Progress of Medicine as a Practical Art. 8vo. cloth, 3*s.* 6*d.*

DR. EDWARD ELLIS, M.D.

A PRACTICAL MANUAL OF THE DISEASES OF CHILDREN. With a Formulary. Crown 8vo. cloth, 6*s.*

SIR JAMES EYRE, M.D.

I.

THE STOMACH AND ITS DIFFICULTIES. Sixth Edition, by Mr. Beale. Fcap. 8vo., 2*s.* 6*d.*

II.

PRACTICAL REMARKS ON SOME EXHAUSTING DISEASES. Second Edition. Post 8vo. cloth, 4*s.* 6*d.*

DR. FAYRER, M.D., F.R.C.S., C.S.I.

CLINICAL SURGERY IN INDIA. With Engravings. 8vo. cloth, 16*s.*

DR. FENWICK.

I.

THE MORBID STATES OF THE STOMACH AND DUODENUM, AND THEIR RELATIONS TO THE DISEASES OF OTHER ORGANS. With 10 Plates. 8vo. cloth, 12*s.*

II.

THE STUDENT'S GUIDE TO MEDICAL DIAGNOSIS. With 41 Engravings. Fcap. 8vo. cloth, 5*s.* 6*d.*

SIR WILLIAM FERGUSSON, BART., F.R.S.

I.

A SYSTEM OF PRACTICAL SURGERY; with numerous Illustrations on Wood. Fourth Edition. Fcap. 8vo. cloth, 12*s.* 6*d.*

II.

LECTURES ON THE PROGRESS OF ANATOMY AND SURGERY DURING THE PRESENT CENTURY. With numerous Engravings. 8vo. cloth, 10*s.* 6*d.*

SIR JOHN FIFE, F.R.C.S. AND MR. URQUHART.

MANUAL OF THE TURKISH BATH. Heat a Mode of Cure and a Source of Strength for Men and Animals. With Engravings. Post 8vo. cloth, 5*s.*

MR. FLOWER, F.R.S., F.R.C.S.

DIAGRAMS OF THE NERVES OF THE HUMAN BODY, exhibiting their Origin, Divisions, and Connexions, with their Distribution to the various Regions of the Cutaneous Surface, and to all the Muscles. Folio, containing Six Plates, 14*s.*

MR. FLUX.

THE LAW TO REGULATE THE SALE OF POISONS WITHIN GREAT BRITAIN. Crown 8vo. cloth, 2*s.* 6*d.*

MR. FOWNES, PH.D., F.R.S.

I.

A MANUAL OF CHEMISTRY; with 187 Illustrations on Wood. Tenth Edition. Fcap. 8vo. cloth, 14*s.*

Edited by H. Bence Jones, M.D., F.R.S., and Henry Watts, B.A., F.R.S.

II.

CHEMISTRY, AS EXEMPLIFYING THE WISDOM AND BENEFICENCE OF GOD. Second Edition. Fcap. 8vo. cloth, 4*s.* 6*d.*

III.

INTRODUCTION TO QUALITATIVE ANALYSIS. Post 8vo. cloth, 2*s.*

DR. D. J. T. FRANCIS.

CHANGE OF CLIMATE; considered as a Remedy in Dyspeptic, Pulmonary, and other Chronic Affections; with an Account of the most Eligible Places of Residence for Invalids, at different Seasons of the Year. Post 8vo. cloth, 8*s.* 6*d.*

DR. FULLER.

I.

ON DISEASES OF THE LUNGS AND AIR PASSAGES. Second Edition. 8vo. cloth, 12*s.* 6*d.*

II.

ON DISEASES OF THE HEART AND GREAT VESSELS. 8vo. cloth, 7*s.* 6*d.*

III.

ON RHEUMATISM, RHEUMATIC GOUT, AND SCIATICA: their Pathology, Symptoms, and Treatment. Third Edition. 8vo. cloth, 12*s.* 6*d.*

PROFESSOR FRESENIUS.

A SYSTEM OF INSTRUCTION IN CHEMICAL ANALYSIS, Edited by Arthur Vacher.
Qualitative. Seventh Edition. 8vo. cloth, 9*s.*
Quantitative. Fifth Edition. 8vo. cloth.

MR. GALLOWAY.

I.

THE FIRST STEP IN CHEMISTRY. With numerous Engravings. Fourth Edition. Fcap. 8vo. cloth, 6*s.* 6*d.*

II.

A KEY TO THE EXERCISES CONTAINED IN ABOVE. Fcap. 8vo., 2*s.* 6*d.*

III.

THE SECOND STEP IN CHEMISTRY; or, the Student's Guide to the Higher Branches of the Science. With Engravings. 8vo. cloth, 10*s.*

IV.

A MANUAL OF QUALITATIVE ANALYSIS. Fifth Edition. With Engravings. Post 8vo. cloth, 8*s.* 6*d.*

V.

CHEMICAL TABLES. On Five Large Sheets, for School and Lecture Rooms. Second Edition. 4*s.* 6*d.*

MR. J. SAMPSON GAMGEE.

HISTORY OF A SUCCESSFUL CASE OF AMPUTATION AT THE HIP-JOINT (the limb 48-in. in circumference, 99 pounds weight). With 4 Photographs. 4to cloth, 10*s.* 6*d.*

MR. F. J. GANT, F.R.C.S.

I.

THE PRINCIPLES OF SURGERY: Clinical, Medical, and Operative. With Engravings. 8vo. cloth, 18*s.*

II.

THE IRRITABLE BLADDER: its Causes and Curative Treatment. Second Edition, enlarged. Crown 8vo. cloth, 5*s.*

MR. GAY, F.R.C.S.

ON VARICOSE DISEASE OF THE LOWER EXTREMITIES. Lettsomian Lectures. With Plates. 8vo. cloth, 5*s.*

SIR DUNCAN GIBB, BART., M.D.

I.

ON DISEASES OF THE THROAT AND WINDPIPE, as reflected by the Laryngoscope. Second Edition. With 116 Engravings. Post 8vo. cloth, 10*s.* 6*d.*

II.

THE LARYNGOSCOPE IN DISEASES OF THE THROAT, with a Chapter on Rhinoscopy. Third Edition, with Engravings. Crown 8vo., cloth, 5*s.*

DR. GORDON, M.D., C.B.

I.

ARMY HYGIENE. 8vo. cloth, 20*s.*

II.

CHINA, FROM A MEDICAL POINT OF VIEW; IN 1860 AND 1861; With a Chapter on Nagasaki as a Sanatarium. 8vo. cloth, 10*s.* 6*d.*

DR. GAIRDNER.

ON GOUT; its History, its Causes, and its Cure. Fourth Edition. Post 8vo. cloth, 8*s.* 6*d.*

DR. GRABHAM, M.D., M.R.C.P.

THE CLIMATE AND RESOURCES OF MADEIRA, as regarding chiefly the Necessities of Consumption and the Welfare of Invalids. With Map and Engravings. Crown 8vo. cloth, 5*s.*

DR. GRAVES M.D., F.R.S.

STUDIES IN PHYSIOLOGY AND MEDICINE. Edited by Dr. Stokes. With Portrait and Memoir. 8vo. cloth, 14*s.*

MR. GRIFFITHS.

CHEMISTRY OF THE FOUR SEASONS—Spring, Summer, Autumn, Winter. Illustrated with Engravings on Wood. Second Edition. Foolscap 8vo. cloth, 7*s.* 6*d.*

DR. GULLY.

THE SIMPLE TREATMENT OF DISEASE; deduced from the Methods of Expectancy and Revulsion. 18mo. cloth, 4*s.*

DR. GUY AND DR. JOHN HARLEY.

HOOPER'S PHYSICIAN'S VADE-MECUM; OR, MANUAL OF THE PRINCIPLES AND PRACTICE OF PHYSIC. Seventh Edition. With Engravings. Foolscap 8vo. cloth, 12*s.* 6*d.*

GUY'S HOSPITAL REPORTS. Third Series. Vol. XV., 8vo. 7*s.* 6*d.*

DR. HABERSHON, F.R.C.P.

I.

ON DISEASES OF THE ABDOMEN, comprising those of the Stomach and other Parts of the Alimentary Canal, Œsophagus, Stomach, Cæcum, Intestines, and Peritoneum. Second Edition, with Plates. 8vo. cloth, 14*s.*

II.

ON THE INJURIOUS EFFECTS OF MERCURY IN THE TREATMENT OF DISEASE. Post 8vo. cloth, 3*s.* 6*d.*

DR. C. RADCLYFFE HALL.

TORQUAY IN ITS MEDICAL ASPECT AS A RESORT FOR PULMONARY INVALIDS. Post 8vo. cloth, 5*s.*

DR. MARSHALL HALL, F.R.S.

I.

PRONE AND POSTURAL RESPIRATION IN DROWNING AND OTHER FORMS OF APNŒA OR SUSPENDED RESPIRATION. Post 8vo. cloth. 5*s.*

II.

PRACTICAL OBSERVATIONS AND SUGGESTIONS IN MEDICINE. Second Series. Post 8vo. cloth, 8*s.* 6*d.*

MR. HARDWICH.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY. With Engravings. Seventh Edition. Foolscap 8vo. cloth, 7*s.* 6*d.*

DR. J. BOWER HARRISON, M.D., M.R.C.P.

I.

LETTERS TO A YOUNG PRACTITIONER ON THE DISEASES OF CHILDREN. Foolscap 8vo. cloth, 3*s.*

II.

ON THE CONTAMINATION OF WATER BY THE POISON OF LEAD, and its Effects on the Human Body. Foolscap 8vo. cloth, 3*s.* 6*d.*

DR. HARTWIG.

I.

ON SEA BATHING AND SEA AIR. Second Edition. Fcap. 8vo., 2*s.* 6*d.*

II.

ON THE PHYSICAL EDUCATION OF CHILDREN. Fcap. 8vo., 2*s.* 6*d.*

DR. A. H. HASSALL.

THE URINE, IN HEALTH AND DISEASE; being an Explanation of the Composition of the Urine, and of the Pathology and Treatment of Urinary and Renal Disorders. Second Edition. With 79 Engravings (23 Coloured). Post 8vo. cloth, 12*s.* 6*d.*

MR. ALFRED HAVILAND, M.R.C.S.

CLIMATE, WEATHER, AND DISEASE; being a Sketch of the Opinions of the most celebrated Ancient and Modern Writers with regard to the Influence of Climate and Weather in producing Disease. With Four coloured Engravings. 8vo. cloth, 7*s.*

MR. W. HAYCOCK, M.R.C.V.S.

HORSES; HOW THEY OUGHT TO BE SHOD: being a plain and practical Treatise on the Principles and Practice of the Farrier's Art. With 14 Plates. Cloth, 7*s.* 6*d.*

DR. HEADLAND, M.D., F.R.C.P.

I.

ON THE ACTION OF MEDICINES IN THE SYSTEM. Fourth Edition. 8vo. cloth, 14*s.*

II.

A MEDICAL HANDBOOK; comprehending such Information on Medical and Sanitary Subjects as is desirable in Educated Persons. Second Thousand. Foolscap 8vo. cloth, 5*s.*

DR. HEALE.

I.

A TREATISE ON THE PHYSIOLOGICAL ANATOMY OF THE LUNGS. With Engravings. 8vo. cloth, 8*s.*

II.

A TREATISE ON VITAL CAUSES. 8vo. cloth, 9*s.*

MR. CHRISTOPHER HEATH, F.R.C.S.

I.

PRACTICAL ANATOMY: a Manual of Dissections. With numerous Engravings. Second Edition. Fcap. 8vo. cloth, 12*s*. 6*d*.

II.

A MANUAL OF MINOR SURGERY AND BANDAGING, FOR THE USE OF HOUSE-SURGEONS, DRESSERS, AND JUNIOR PRACTITIONERS. With Illustrations. Third Edition. Fcap. 8vo. cloth, 5*s*.

III.

INJURIES AND DISEASES OF THE JAWS. JACKSONIAN PRIZE ESSAY. With Engravings. 8vo. cloth, 12*s*.

MR. HIGGINBOTTOM, F.R.S., F.R.C.S.E.

A PRACTICAL ESSAY ON THE USE OF THE NITRATE OF SILVER IN THE TREATMENT OF INFLAMMATION, WOUNDS, AND ULCERS. Third Edition, 8vo. cloth, 6*s*.

DR. HINDS.

THE HARMONIES OF PHYSICAL SCIENCE IN RELATION TO THE HIGHER SENTIMENTS; with Observations on Medical Studies, and on the Moral and Scientific Relations of Medical Life. Post 8vo. cloth, 4*s*.

MR. J. A. HINGESTON, M.R.C.S.

TOPICS OF THE DAY, MEDICAL, SOCIAL, AND SCIENTIFIC. Crown 8vo. cloth, 7*s*. 6*d*.

DR. HODGES.

THE NATURE, PATHOLOGY, AND TREATMENT OF PUERPERAL CONVULSIONS. Crown 8vo. cloth, 3s.

DR. DECIMUS HODGSON.

THE PROSTATE GLAND, AND ITS ENLARGEMENT IN OLD AGE. With 12 Plates. Royal 8vo. cloth, 6*s*.

MR. JABEZ HOGG.

A MANUAL OF OPHTHALMOSCOPIC SURGERY; being a Practical Treatise on the Use of the Ophthalmoscope in Diseases of the Eye. Third Edition. With Coloured Plates. 8vo. cloth, 10*s*. 6*d*.

MR. LUTHER HOLDEN, F.R.C.S.

I.

HUMAN OSTEOLOGY: with Plates, showing the Attachments of the Muscles. Fourth Edition. 8vo. cloth, 16*s*.

II.

A MANUAL OF THE DISSECTION OF THE HUMAN BODY. With Engravings on Wood. Third Edition. 8vo. cloth, 16*s*.

MR. BARNARD HOLT, F.R.C.S.

ON THE IMMEDIATE TREATMENT OF STRICTURE OF THE URETHRA. Third Edition, Enlarged. 8vo. cloth, 6*s*.

SIR CHARLES HOOD, M.D.

SUGGESTIONS FOR THE FUTURE PROVISION OF CRIMINAL LUNATICS. 8vo. cloth, 5*s*. 6*d*.

DR. P. HOOD.

THE SUCCESSFUL TREATMENT OF SCARLET FEVER; also, OBSERVATIONS ON THE PATHOLOGY AND TREATMENT OF CROWING INSPIRATIONS OF INFANTS. Post 8vo. cloth, 5*s*.

MR. JOHN HORSLEY.

A CATECHISM OF CHEMICAL PHILOSOPHY; being a Familiar Exposition of the Principles of Chemistry and Physics. With Engravings on Wood. Designed for the Use of Schools and Private Teachers. Post 8vo. cloth, 6*s*. 6*d*.

DR. JAMES A. HORTON, M.D.

PHYSICAL AND MEDICAL CLIMATE AND METEOROLOGY OF THE WEST COAST OF AFRICA. 8vo. cloth, 10*s*.

MR. LUKE HOWARD, F.R.S.

ESSAY ON THE MODIFICATIONS OF CLOUDS. Third Edition, by W. D. and E. Howard. With 6 Lithographic Plates, from Pictures by Kenyon. 4to. cloth, 10*s*. 6*d*.

DR. HAMILTON HOWE, M.D.

A THEORETICAL INQUIRY INTO THE PHYSICAL CAUSE OF EPIDEMIC DISEASES. Accompanied with Tables. 8vo. cloth, 7*s*.

DR. HUFELAND.

THE ART OF PROLONGING LIFE. Second Edition. Edited by Erasmus Wilson, F.R.S. Foolscap 8vo., 2*s*. 6*d*.

MR. W. CURTIS HUGMAN, F.R.C.S.

ON HIP-JOINT DISEASE; with reference especially to Treatment by Mechanical Means for the Relief of Contraction and Deformity of the Affected Limb. With Plates. Re-issue, enlarged. 8vo. cloth, 3*s*. 6*d*.

MR. HULKE, F.R.C.S.

A PRACTICAL TREATISE ON THE USE OF THE OPHTHALMOSCOPE. Being the Jacksonian Prize Essay for 1859. Royal 8vo. cloth, 8*s*.

DR. HENRY HUNT.

ON HEARTBURN AND INDIGESTION. 8vo. cloth, 5*s*.

MR. G. Y. HUNTER, M.R.C.S.

BODY AND MIND: the Nervous System and its Derangements. Fcap. 8vo. cloth, 3*s*. 6*d*.

MR. JONATHAN HUTCHINSON, F.R.C.S.

A CLINICAL MEMOIR ON CERTAIN DISEASES OF THE EYE AND EAR, CONSEQUENT ON INHERITED SYPHILIS; with an appended Chapter of Commentaries on the Transmission of Syphilis from Parent to Offspring, and its more remote Consequences. With Plates and Woodcuts, 8vo. cloth, 9*s.*

PROF. HUXLEY, LL.D., F.R.S.

INTRODUCTION TO THE CLASSIFICATION OF ANIMALS. With Engravings. 8vo. cloth, 6*s.*

DR. INMAN, M.R.C.P.

I.

ON MYALGIA: ITS NATURE, CAUSES, AND TREATMENT; being a Treatise on Painful and other Affections of the Muscular System. Second Edition. 8vo. cloth, 9*s.*

II.

FOUNDATION FOR A NEW THEORY AND PRACTICE OF MEDICINE. Second Edition. Crown 8vo. cloth, 10*s.*

DR. JAGO, M.D.OXON., A.B.CANTAB.

ENTOPTICS, WITH ITS USES IN PHYSIOLOGY AND MEDICINE. With 54 Engravings. Crown 8vo. cloth, 5*s.*

DR. PROSSER JAMES, M.D.

SORE-THROAT: ITS NATURE, VARIETIES, AND TREATMENT; including the Use of the LARYNGOSCOPE as an Aid to Diagnosis. Second Edition, with numerous Engravings. Post 8vo. cloth, 5*s.*

DR. JENCKEN, M.D., M.R.C.P.

THE CHOLERA: ITS ORIGIN, IDIOSYNCRACY, AND TREATMENT. Fcap. 8vo. cloth, 2*s.* 6*d.*

DR. HANDFIELD JONES, M.B., F.R.C.P.

CLINICAL OBSERVATIONS ON FUNCTIONAL NERVOUS DISORDERS. Post 8vo. cloth, 10*s.* 6*d.*

DR. H. BENCE JONES, M.D., F.R.S.

I.

LECTURES ON SOME OF THE APPLICATIONS OF CHEMISTRY AND MECHANICS TO PATHOLOGY AND THERAPEUTICS. 8vo. cloth, 12*s.*

II.

CROONIAN LECTURES ON MATTER AND FORCE. Fcap. 8vo. cloth, 5*s.*

DR. HANDFIELD JONES, F.R.S., & DR. EDWARD H. SIEVEKING.

A MANUAL OF PATHOLOGICAL ANATOMY. Illustrated with numerous Engravings on Wood. Foolscap 8vo. cloth, 12*s.* 6*d.*

DR. JAMES JONES, M.D., M.R.C.P.

ON THE USE OF PERCHLORIDE OF IRON AND OTHER CHALYBEATE SALTS IN THE TREATMENT OF CONSUMPTION. Crown 8vo. cloth, 3*s.* 6*d.*

* * *

MR. WHARTON JONES, F.R.S.

I.

A MANUAL OF THE PRINCIPLES AND PRACTICE OF OPHTHALMIC MEDICINE AND SURGERY; with Nine Coloured Plates and 173 Wood Engravings. Third Edition, thoroughly revised. Foolscap 8vo. cloth, 12*s.* 6*d.*

II.

THE WISDOM AND BENEFICENCE OF THE ALMIGHTY, AS DISPLAYED IN THE SENSE OF VISION. Actonian Prize Essay. With Illustrations on Steel and Wood. Foolscap 8vo. cloth, 4*s.* 6*d.*

III.

DEFECTS OF SIGHT AND HEARING: their Nature, Causes, Prevention, and General Management. Second Edition, with Engravings. Fcap. 8vo. 2*s.* 6*d.*

IV.

A CATECHISM OF THE MEDICINE AND SURGERY OF THE EYE AND EAR. For the Clinical Use of Hospital Students. Fcap. 8vo. 2*s.* 6*d.*

V.

A CATECHISM OF THE PHYSIOLOGY AND PHILOSOPHY OF BODY, SENSE, AND MIND. For Use in Schools and Colleges. Fcap. 8vo., 2*s.* 6*d.*

* * *

DR. LAENNEC.

A MANUAL OF AUSCULTATION AND PERCUSSION. Translated and Edited by J. B. Sharpe, M.R.C.S. 3*s.*

* * *

DR. LANE, M.A.

HYDROPATHY; OR, HYGIENIC MEDICINE. An Explanatory Essay. Second Edition. Post 8vo. cloth, 5*s.*

* * *

SIR WM. LAWRENCE, BART., F.R.S.

I.

LECTURES ON SURGERY. 8vo. cloth, 16*s.*

II.

A TREATISE ON RUPTURES. The Fifth Edition, considerably enlarged. 8vo. cloth, 16*s.*

* * *

DR. LEARED, M.R.C.P.

IMPERFECT DIGESTION: ITS CAUSES AND TREATMENT. Fifth Edition. Foolscap 8vo. cloth, 4*s.* 6*d.*

* * *

MR. HENRY LEE, F.R.C.S.

I.

ON SYPHILIS. Second Edition. With Coloured Plates. 8vo. cloth, 10*s.*

II.

ON DISEASES OF THE VEINS, HÆMORRHOIDAL TUMOURS, AND OTHER AFFECTIONS OF THE RECTUM. Second Edition. 8vo. cloth, 8*s.*

DR. EDWIN LEE.

I.

THE EFFECT OF CLIMATE ON TUBERCULOUS DISEASE, with Notices of the chief Foreign Places of Winter Resort. Small 8vo. cloth, 4*s.* 6*d.*

II.

THE WATERING PLACES OF ENGLAND, CONSIDERED with Reference to their Medical Topography. Fourth Edition. Fcap. 8vo. cloth, 7*s.* 6*d.*

III.

THE BATHS OF FRANCE. Fourth Edition. Fcap. 8vo. cloth, 4*s.* 6*d.*

IV.

THE BATHS OF GERMANY. Fourth Edition. Post 8vo. cloth, 7*s.*

V.

THE BATHS OF SWITZERLAND. 12mo. cloth, 3*s.* 6*d.*

VI.

HOMŒOPATHY AND HYDROPATHY IMPARTIALLY APPRECIATED. Fourth Edition. Post 8vo. cloth, 3*s.*

* * *

DR. ROBERT LEE, F.R.S.

I.

CONSULTATIONS IN MIDWIFERY. Foolscap 8vo. cloth, 4*s.* 6*d.*

II.

A TREATISE ON THE SPECULUM; with Three Hundred Cases. 8vo. cloth, 4*s.* 6*d.*

III.

CLINICAL REPORTS OF OVARIAN AND UTERINE DISEASES, with Commentaries. Foolscap 8vo. cloth, 6*s.* 6*d.*

IV.

CLINICAL MIDWIFERY: comprising the Histories of 545 Cases of Difficult, Preternatural, and Complicated Labour, with Commentaries. Second Edition. Foolscap 8vo. cloth, 5*s.*

* * *

DR. LEISHMAN, M.D., F.F.P.S.

THE MECHANISM OF PARTURITION: An Essay, Historical and Critical. With Engravings. 8vo. cloth, 5*s.*

* * *

MR. F. HARWOOD LESCHER.

THE ELEMENTS OF PHARMACY. 8vo. cloth, 7*s.* 6*d.*

* * *

MR. LISTON, F.R.S.

PRACTICAL SURGERY. Fourth Edition. 8vo. cloth, 22*s.*

* * *

MR. H. W. LOBB, L.S.A., M.R.C.S.E.

ON SOME OF THE MORE OBSCURE FORMS OF NERVOUS AFFECTIONS, THEIR PATHOLOGY AND TREATMENT. Re-issue, with the Chapter on Galvanism entirely Re-written. With Engravings. 8vo. cloth, 8*s.*

* * *

DR. LOGAN, M.D., M.R.C.P.LOND.

ON OBSTINATE DISEASES OF THE SKIN. Fcap. 8vo. cloth, 2*s.* 6*d.*

* * *

LONDON HOSPITAL.

CLINICAL LECTURES AND REPORTS BY THE MEDICAL AND SURGICAL STAFF. With Illustrations. Vols. I. to IV. 8vo. cloth, 7*s.* 6*d.*

LONDON MEDICAL SOCIETY OF OBSERVATION.

WHAT TO OBSERVE AT THE BED-SIDE, AND AFTER DEATH. Published by Authority. Second Edition. Foolscap 8vo. cloth, 4*s.* 6*d.*

MR. HENRY LOWNDES, M.R.C.S.

AN ESSAY ON THE MAINTENANCE OF HEALTH. Fcap. 8vo. cloth, 2*s.* 6*d.*

MR. M'CLELLAND, F.L.S., F.G.S.

THE MEDICAL TOPOGRAPHY, OR CLIMATE AND SOILS, OF BENGAL AND THE N. W. PROVINCES. Post 8vo. cloth, 4*s.* 6*d.*

DR. MACLACHLAN, M.D., F.R.C.P.L.

THE DISEASES AND INFIRMITIES OF ADVANCED LIFE. 8vo. cloth, 16*s.*

DR. A. C. MACLEOD, M.R.C.P.LOND.

ACHOLIC DISEASES; comprising Jaundice, Diarrhœa, Dysentery, and Cholera. Post 8vo. cloth, 5*s.* 6*d.*

DR. GEORGE H. B. MACLEOD, F.R.C.S.E.

I.

OUTLINES OF SURGICAL DIAGNOSIS. 8vo. cloth, 12*s.* 6*d.*

II.

NOTES ON THE SURGERY OF THE CRIMEAN WAR; with REMARKS on GUN-SHOT WOUNDS. 8vo. cloth, 10*s.* 6*d.*

DR. WM. MACLEOD, F.R.C.P.EDIN.

THE THEORY OF THE TREATMENT OF DISEASE ADOPTED AT BEN RHYDDING. Fcap. 8vo. cloth, 2*s.* 6*d.*

MR. JOSEPH MACLISE, F.R.C.S.

I.

SURGICAL ANATOMY. A Series of Dissections, illustrating the Principal Regions of the Human Body. Second Edition, folio, cloth, £3. 12*s.*; half-morocco, £4. 4*s.*

II.

ON DISLOCATIONS AND FRACTURES. This Work is Uniform with "Surgical Anatomy;" folio, cloth, £2. 10*s.*; half-morocco, £2. 17*s.*

MR. MACNAMARA.

I.

A MANUAL OF THE DISEASES OF THE EYE. With Coloured Plates. Fcap. 8vo. cloth, 12*s.* 6*d.*

II.

A TREATISE ON ASIATIC CHOLERA; with Maps. 8vo. cloth, 16*s.*

DR. MC NICOLL, M.R.C.P.

A HAND-BOOK FOR SOUTHPORT, MEDICAL & GENERAL; with Copious Notices of the Natural History of the District. Second Edition. Post 8vo. cloth, 3*s.* 6*d.*

DR. MARCET, F.R.S.

ON CHRONIC ALCOHOLIC INTOXICATION; with an INQUIRY INTO THE INFLUENCE OF THE ABUSE OF ALCOHOL AS A PREDISPOSING CAUSE OF DISEASE. Second Edition, much enlarged. Foolscap 8vo. cloth, 4*s.* 6*d.*

DR. J. MACPHERSON, M.D.

CHOLERA IN ITS HOME; with a Sketch of the Pathology and Treatment of the Disease. Crown 8vo. cloth, 5*s.*

* * *

DR. MARKHAM.

I.

DISEASES OF THE HEART: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT. Second Edition. Post 8vo. cloth, 6*s.*

II.

SKODA ON AUSCULTATION AND PERCUSSION. Post 8vo. cloth, 6*s.*

III.

BLEEDING AND CHANGE IN TYPE OF DISEASES. Gulstonian Lectures for 1864. Crown 8vo. 2*s.* 6*d.*

* * *

DR. ALEXANDER MARSDEN, M.D., F.R.C.S.

A NEW AND SUCCESSFUL MODE OF TREATING CERTAIN FORMS OF CANCER; to which is prefixed a Practical and Systematic Description of all the Varieties of this Disease. With Coloured Plates. 8vo. cloth, 6*s.* 6*d.*

* * *

SIR RANALD MARTIN, K.C.B., F.R.S.

INFLUENCE OF TROPICAL CLIMATES IN PRODUCING THE ACUTE ENDEMIC DISEASES OF EUROPEANS; including Practical Observations on their Chronic Sequelæ under the Influences of the Climate of Europe. Second Edition, much enlarged. 8vo. cloth, 20*s.*

* * *

DR. P. MARTYN, M.D.LOND.

HOOPING-COUGH; ITS PATHOLOGY AND TREATMENT. With Engravings. 8vo. cloth, 2*s.* 6*d.*

* * *

MR. C. F. MAUNDER, F.R.C.S.

OPERATIVE SURGERY. With 158 Engravings. Post 8vo. 6*s.*

* * *

DR. MAYNE, M.D., LL.D.

I.

AN EXPOSITORY LEXICON OF THE TERMS, ANCIENT AND MODERN, IN MEDICAL AND GENERAL SCIENCE. 8vo. cloth, £2. 10*s.*

II.

A MEDICAL VOCABULARY; or, an Explanation of all Names, Synonymes, Terms, and Phrases used in Medicine and the relative branches of Medical Science. Third Edition. Fcap. 8vo. cloth, 8*s.* 6*d.*

* * *

DR. MERYON, M.D., F.R.C.P.

PATHOLOGICAL AND PRACTICAL RESEARCHES ON THE VARIOUS FORMS OF PARALYSIS. 8vo. cloth, 6*s.*

* * *

DR. W. J. MOORE, M.D.

I.

HEALTH IN THE TROPICS; or, Sanitary Art applied to Europeans in India. 8vo. cloth, 9*s.*

II.

A MANUAL OF THE DISEASES OF INDIA. Fcap. 8vo. cloth, 5*s.*

DR. JAMES MORRIS, M.D.LOND.

I.

GERMINAL MATTER AND THE CONTACT THEORY: An Essay on the Morbid Poisons. Second Edition. Crown 8vo. cloth, 4*s.* 6*d.*

II.

IRRITABILITY: Popular and Practical Sketches of Common Morbid States and Conditions bordering on Disease; with Hints for Management, Alleviation, and Cure. Crown 8vo. cloth, 4*s.* 6*d.*

PROFESSOR MULDER, UTRECHT.

THE CHEMISTRY OF WINE. Edited by H. BENCE JONES, M.D., F.R.S. Fcap. 8vo. cloth, 6*s.*

DR. W. MURRAY, M.D., M.R.C.P.

EMOTIONAL DISORDERS OF THE SYMPATHETIC SYSTEM OF NERVES. Crown 8vo. cloth, 3*s.* 6*d.*

DR. MUSHET, M.B., M.R.C.P.

ON APOPLEXY, AND ALLIED AFFECTIONS OF THE BRAIN. 8vo. cloth, 7*s.*

MR. NAYLER, F.R.C.S.

ON THE DISEASES OF THE SKIN. With Plates. 8vo. cloth, 10*s.* 6*d.*

DR. BIRKBECK NEVINS.

THE PRESCRIBER'S ANALYSIS OF THE BRITISH PHARMACOPEIA of 1867. 32mo. cloth, 3*s.* 6*d.*

DR. THOS. NICHOLSON, M.D.

ON YELLOW FEVER; comprising the History of that Disease as it appeared in the Island of Antigua. Fcap. 8vo. cloth, 2*s.* 6*d.*

DR. NOAD, PH.D., F.R.S.

THE INDUCTION COIL, being a Popular Explanation of the Electrical Principles on which it is constructed. Third Edition. With Engravings. Fcap. 8vo. cloth, 3*s.*

DR. NOBLE.

THE HUMAN MIND IN ITS RELATIONS WITH THE BRAIN AND NERVOUS SYSTEM. Post 8vo. cloth, 4*s.* 6*d.*

MR. NUNNELEY, F.R.C.S.E.

I.

ON THE ORGANS OF VISION: THEIR ANATOMY AND PHYSIOLOGY. With Plates, 8vo. cloth, 15*s.*

II.

A TREATISE ON THE NATURE, CAUSES, AND TREATMENT OF ERYSIPELAS. 8vo. cloth, 10*s.* 6*d.*

DR. OPPERT, M.D.

I.

HOSPITALS, INFIRMARIES, AND DISPENSARIES; their Construction, Interior Arrangement, and Management, with Descriptions of existing Institutions. With 58 Engravings. Royal 8vo. cloth, 10*s.* 6*d.*

II.

VISCERAL AND HEREDITARY SYPHILIS. 8vo. cloth, 5*s.*

MR. LANGSTON PARKER.

THE MODERN TREATMENT OF SYPHILITIC DISEASES, both Primary and Secondary; comprising the Treatment of Constitutional and Confirmed Syphilis, by a safe and successful Method. Fourth Edition, 8vo. cloth, 10*s.*

DR. PARKES, F.R.S., F.R.C.P.

I.

A MANUAL OF PRACTICAL HYGIENE; intended especially for the Medical Officers of the Army. With Plates and Woodcuts. 3rd Edition, 8vo. cloth, 16s.

II.

THE URINE: ITS COMPOSITION IN HEALTH AND DISEASE, AND UNDER THE ACTION OF REMEDIES. 8vo. cloth, 12*s.*

DR. PARKIN, M.D., F.R.C.S.

I.

THE ANTIDOTAL TREATMENT AND PREVENTION OF THE EPIDEMIC CHOLERA. Third Edition. 8vo. cloth, 7*s.* 6*d.*

II.

THE CAUSATION AND PREVENTION OF DISEASE; with the Laws regulating the Extrication of Malaria from the Surface, and its Diffusion in the surrounding Air. 8vo. cloth, 5*s.*

MR. JAMES PART, F.R.C.S.

THE MEDICAL AND SURGICAL POCKET CASE BOOK, for the Registration of important Cases in Private Practice, and to assist the Student of Hospital Practice. Second Edition. 2*s.* 6*d.*

DR. PATTERSON, M.D.

EGYPT AND THE NILE AS A WINTER RESORT FOR PULMONARY AND OTHER INVALIDS. Fcap. 8vo. cloth, 3*s.*

DR. PAVY, M.D., F.R.S., F.R.C.P.

I.

DIABETES: RESEARCHES ON ITS NATURE AND TREATMENT. Second Edition. With Engravings. 8vo. cloth, 10*s.*

II.

DIGESTION: ITS DISORDERS AND THEIR TREATMENT. Second Edition. 8vo. cloth, 8*s.* 6*d.*

DR. PEACOCK, M.D., F.R.C.P.

I.

ON MALFORMATIONS OF THE HUMAN HEART. With Original Cases and Illustrations. Second Edition. With 8 Plates. 8vo. cloth, 10*s.*

II.

ON SOME OF THE CAUSES AND EFFECTS OF VALVULAR DISEASE OF THE HEART. With Engravings. 8vo. cloth, 5*s.*

DR W. H. PEARSE, M.D.EDIN.

NOTES ON HEALTH IN CALCUTTA AND BRITISH EMIGRANT SHIPS, including Ventilation, Diet, and Disease. Fcap. 8vo. 2*s.*

DR. PEREIRA, F.R.S.

SELECTA E PRÆSCRIPTIS. Fifteenth Edition. 24mo. cloth, 5*s.*

DR. PICKFORD.

HYGIENE; or, Health as Depending upon the Conditions of the Atmosphere, Food and Drinks, Motion and Rest, Sleep and Wakefulness, Secretions, Excretions, and Retentions, Mental Emotions, Clothing, Bathing, &c. Vol. I. 8vo. cloth, 9*s.*

PROFESSOR PIRRIE, F.R.S.E.

THE PRINCIPLES AND PRACTICE OF SURGERY. With numerous Engravings on Wood. Second Edition. 8vo. cloth, 24*s.*

PROFESSOR PIRRIE & DR. KEITH.

ACUPRESSURE: an excellent Method of arresting Surgical Hæmorrhage and of accelerating the healing of Wounds. With Engravings. 8vo. cloth, 5*s.*

DR. PIRRIE. M.D.

ON HAY ASTHMA, AND THE AFFECTION TERMED HAY FEVER. Fcap. 8vo. cloth, 2*s.* 6*d.*

PROFESSORS PLATTNER & MUSPRATT.

THE USE OF THE BLOWPIPE IN THE EXAMINATION OF MINERALS, ORES, AND OTHER METALLIC COMBINATIONS. Illustrated by numerous Engravings on Wood. Third Edition. 8vo. cloth, 10*s.* 6*d.*

MR. HENRY POWER, F.R.C.S., M.B.LOND.

ILLUSTRATIONS OF SOME OF THE PRINCIPAL DISEASES OF THE EYE: With an Account of their Symptoms, Pathology and Treatment. Twelve Coloured Plates. 8vo. cloth, 20*s.*

DR. HENRY F. A. PRATT, M.D., M.R.C.P.

I.

THE GENEALOGY OF CREATION, newly Translated from the Unpointed Hebrew Text of the Book of Genesis, showing the General Scientific Accuracy of the Cosmogony of Moses and the Philosophy of Creation. 8vo. cloth, 14*s.*

II.

ON ECCENTRIC AND CENTRIC FORCE: A New Theory of Projection. With Engravings. 8vo. cloth, 10*s.*

III.

ON ORBITAL MOTION: The Outlines of a System of Physical Astronomy. With Diagrams. 8vo. cloth, 7*s.* 6*d.*

IV.

ASTRONOMICAL INVESTIGATIONS. The Cosmical Relations of the Revolution of the Lunar Apsides. Oceanic Tides. With Engravings. 8vo. cloth, 5*s.*

V.

THE ORACLES OF GOD: An Attempt at a Re-interpretation. Part I. The Revealed Cosmos. 8vo. cloth, 10*s.*

THE PRESCRIBER'S PHARMACOPŒIA; containing all the Medicines in the British Pharmacopœia, arranged in Classes according to their Action, with their Composition and Doses. By a Practising Physician. Fifth Edition. 32mo. cloth, 2*s.* 6*d.*; roan tuck (for the pocket), 3*s.* 6*d.*

DR. JOHN ROWLISON PRETTY.

AIDS DURING LABOUR, including the Administration of Chloroform, the Management of Placenta and Post-partum Hæmorrhage. Fcap. 8vo. cloth, 4*s.* 6*d.*

MR. P. C. PRICE, F.R.C.S.

AN ESSAY ON EXCISION OF THE KNEE-JOINT. With Coloured Plates. With Memoir of the Author and Notes by Henry Smith, F.R.C.S. Royal 8vo. cloth, 14*s.*

MR. LAKE PRICE.

PHOTOGRAPHIC MANIPULATION:

A Manual treating of the Practice of the Art, and its various Applications to Nature. With numerous Engravings. Second Edition. Crown 8vo. cloth, 6*s.* 6*d.*

DR. PRIESTLEY.

LECTURES ON THE DEVELOPMENT OF THE GRAVID UTERUS.

8vo. cloth, 5*s.* 6*d.*

MR. RAINEY.

ON THE MODE OF FORMATION OF SHELLS OF ANIMALS, OF BONE, AND OF SEVERAL OTHER STRUCTURES,

by a Process of Molecular Coalescence, Demonstrable in certain Artificially-formed Products. Fcap. 8vo. cloth, 4*s.* 6*d.*

MR. ROBERT RAMSAY AND MR. J. OAKLEY COLES.

DEFORMITIES OF THE MOUTH, CONGENITAL AND ACCIDENTAL:

Their Mechanical Treatment. With Illustrations. 8vo. cloth, 5*s.*

DR. F. H. RAMSBOTHAM.

THE PRINCIPLES AND PRACTICE OF OBSTETRIC MEDICINE AND SURGERY.

Illustrated with One Hundred and Twenty Plates on Steel and Wood; forming one thick handsome volume. Fifth Edition. 8vo. cloth, 22*s.*

DR. READE, M.B.T.C.D., L.R.C.S.I.

SYPHILITIC AFFECTIONS OF THE NERVOUS SYSTEM, AND A CASE OF SYMMETRICAL MUSCULAR ATROPHY;

with other Contributions to the Pathology of the Spinal Marrow. Post 8vo. cloth, 5*s.*

PROFESSOR REDWOOD, PH. D.

A SUPPLEMENT TO THE PHARMACOPŒIA:

A concise but comprehensive Dispensatory, and Manual of Facts and Formulæ, for the use of Practitioners in Medicine and Pharmacy. Third Edition. 8vo. cloth, 22*s.*

DR. DU BOIS REYMOND.

ANIMAL ELECTRICITY;

Edited by H. Bence Jones, M.D., F.R.S. With Fifty Engravings on Wood. Foolscap 8vo. cloth, 6*s.*

DR. REYNOLDS, M.D.LOND., F.R.S.

I.

EPILEPSY: ITS SYMPTOMS, TREATMENT, AND RELATION TO OTHER CHRONIC CONVULSIVE DISEASES.

8vo. cloth, 10*s.*

II.

THE DIAGNOSIS OF DISEASES OF THE BRAIN, SPINAL CORD, AND THEIR APPENDAGES.

8vo. cloth, 8*s.*

DR. B. W. RICHARDSON, F.R.S.

ON THE CAUSE OF THE COAGULATION OF THE BLOOD.

Being the Astley Cooper Prize Essay for 1856. With a Practical Appendix. 8vo. cloth, 16*s.*

DR. RITCHIE, M.D.

ON OVARIAN PHYSIOLOGY AND PATHOLOGY.

With Engravings. 8vo. cloth, 6*s.*

DR. WILLIAM ROBERTS, M.D., F.R.C.P.

AN ESSAY ON WASTING PALSY;

being a Systematic Treatise on the Disease hitherto described as ATROPHIE MUSCULAIRE PROGRESSIVE. With Four Plates. 8vo. cloth, 5*s.*

DR. ROUTH.

INFANT FEEDING, AND ITS INFLUENCE ON LIFE;

Or, the Causes and Prevention of Infant Mortality. Second Edition. Fcap. 8vo. cloth, 6*s.*

DR. W. H. ROBERTSON.

I.

THE NATURE AND TREATMENT OF GOUT.

8vo. cloth, 10*s.* 6*d.*

II.

A TREATISE ON DIET AND REGIMEN.

Fourth Edition. 2 vols. 12*s.* post 8vo. cloth.

DR. ROWE.

NERVOUS DISEASES, LIVER AND STOMACH COMPLAINTS, LOW SPIRITS, INDIGESTION, GOUT, ASTHMA, AND DISORDERS PRODUCED BY TROPICAL CLIMATES.

With Cases. Sixteenth Edition. Fcap. 8vo. 2*s.* 6*d.*

DR. ROYLE, F.R.S., AND DR. HEADLAND, M.D.

A MANUAL OF MATERIA MEDICA AND THERAPEUTICS.

With numerous Engravings on Wood. Fifth Edition. Fcap. 8vo. cloth, 12*s.* 6*d.*

DR. RYAN, M.D.

INFANTICIDE: ITS LAW, PREVALENCE, PREVENTION, AND HISTORY.

8vo. cloth, 5*s.*

ST. BARTHOLOMEW'S HOSPITAL.

A DESCRIPTIVE CATALOGUE OF THE ANATOMICAL MUSEUM.

Vol. I. (1846), Vol. II. (1851), Vol. III. (1862), 8vo. cloth, 5*s.* each.

ST. GEORGE'S HOSPITAL REPORTS.

Vols. I. to IV. 8vo. 7*s.* 6*d.*

MR. T. P. SALT, BIRMINGHAM.

ON DEFORMITIES AND DEBILITIES OF THE LOWER EXTREMITIES AND THE MECHANICAL TREATMENT EMPLOYED IN THE PROMOTION OF THEIR CURE.

With Plates. 8vo. cloth, 15*s.*

DR. SALTER, F.R.S.

ASTHMA.

Second Edition. 8vo. cloth, 10*s.*

DR. SANKEY, M.D.LOND.

LECTURES ON MENTAL DISEASES.

8vo. cloth, 8*s.*

DR. SANSOM, M.D.LOND.

I.

CHLOROFORM: ITS ACTION AND ADMINISTRATION. A Handbook. With Engravings. Crown 8vo. cloth, 5*s.*

II.

THE ARREST AND PREVENTION OF CHOLERA; being a Guide to the Antiseptic Treatment. Fcap. 8vo. cloth, 2*s.* 6*d.*

MR. SAVORY.

A COMPENDIUM OF DOMESTIC MEDICINE, AND COMPANION TO THE MEDICINE CHEST; intended as a Source of Easy Reference for Clergymen, and for Families residing at a Distance from Professional Assistance. Seventh Edition. 12mo. cloth, 5*s.*

DR. SCHACHT.

THE MICROSCOPE, AND ITS APPLICATION TO VEGETABLE ANATOMY AND PHYSIOLOGY. Edited by FREDERICK CURREY, M.A. Fcap. 8vo. cloth, 6*s.*

DR. SCORESBY-JACKSON, M.D., F.R.S.E.

MEDICAL CLIMATOLOGY; or, a Topographical and Meteorological Description of the Localities resorted to in Winter and Summer by Invalids of various classes both at Home and Abroad. With an Isothermal Chart. Post 8vo. cloth, 12*s.*

DR. SEMPLE.

ON COUGH: its Causes, Varieties, and Treatment. With some practical Remarks on the Use of the Stethoscope as an aid to Diagnosis. Post 8vo. cloth, 4*s.* 6*d.*

DR. SEYMOUR.

I.

ILLUSTRATIONS OF SOME OF THE PRINCIPAL DISEASES OF THE OVARIA: their Symptoms and Treatment; to which are prefixed Observations on the Structure and Functions of those parts in the Human Being and in Animals. On India paper. Folio, 16*s.*

II.

THE NATURE AND TREATMENT OF DROPSY; considered especially in reference to the Diseases of the Internal Organs of the Body, which most commonly produce it. 8vo. 5*s.*

DR. SHAPTER, M.D., F.R.C.P.

THE CLIMATE OF THE SOUTH OF DEVON, AND ITS INFLUENCE UPON HEALTH. Second Edition, with Maps. 8vo. cloth, 10*s.* 6*d.*

MR. SHAW, M.R.C.S.

THE MEDICAL REMEMBRANCER; OR, BOOK OF EMERGENCIES. Fifth Edition. Edited, with Additions, by JONATHAN HUTCHINSON, F.R.C.S. 32mo. cloth, 2*s.* 6*d.*

DR. SHEA, M.D., B.A.

A MANUAL OF ANIMAL PHYSIOLOGY With an Appendix of Questions for the B.A. London and other Examinations. With Engravings. Foolscap 8vo. cloth, 5*s.* 6*d.*

DR. SHRIMPTON.

CHOLERA: ITS SEAT, NATURE, AND TREATMENT. With Engravings. 8vo. cloth, 4*s.* 6*d.*

MR. U. J. KAY-SHUTTLEWORTH, M.P.

FIRST PRINCIPLES OF MODERN CHEMISTRY: a Manual of Inorganic Chemistry. Second Edition. Crown 8vo. cloth, 4*s.* 6*d.*

DR. SIBSON, F.R.S.

MEDICAL ANATOMY. With coloured Plates. Imperial folio. Complete in Seven Fasciculi. 5*s.* each.

DR. E. H. SIEVEKING.

ON EPILEPSY AND EPILEPTIFORM SEIZURES: their Causes, Pathology, and Treatment. Second Edition. Post 8vo. cloth, 10*s.* 6*d.*

DR. SIMMS.

A WINTER IN PARIS: being a few Experiences and Observations of French Medical and Sanitary Matters. Fcap. 8vo. cloth, 4*s.*

MR. SINCLAIR AND DR. JOHNSTON.

PRACTICAL MIDWIFERY: Comprising an Account of 13,748 Deliveries, which occurred in the Dublin Lying-in Hospital, during a period of Seven Years. 8vo. cloth, 10*s.*

DR. SIORDET, M.B.LOND., M.R.C.P.

MENTONE IN ITS MEDICAL ASPECT. Foolscap 8vo. cloth, 2*s.* 6*d.*

MR. ALFRED SMEE, F.R.S.

GENERAL DEBILITY AND DEFECTIVE NUTRITION; their Causes, Consequences, and Treatment. Second Edition. Fcap. 8vo. cloth, 3*s.* 6*d.*

DR. SMELLIE.

OBSTETRIC PLATES: being a Selection from the more Important and Practical Illustrations contained in the Original Work. With Anatomical and Practical Directions. 8vo. cloth, 5*s.*

MR. HENRY SMITH, F.R.C.S.

I.

ON STRICTURE OF THE URETHRA. 8vo. cloth, 7*s.* 6*d.*

II.

HÆMORRHOIDS AND PROLAPSUS OF THE RECTUM: Their Pathology and Treatment, with especial reference to the use of Nitric Acid. Third Edition. Fcap. 8vo. cloth, 3*s.*

III.

THE SURGERY OF THE RECTUM. Lettsomian Lectures. Second Edition. Fcap. 8vo. 3*s.* 6*d.*

DR. J. SMITH, M.D., F.R.C.S.EDIN.

HANDBOOK OF DENTAL ANATOMY AND SURGERY, FOR THE USE OF STUDENTS AND PRACTITIONERS. Fcap. 8vo. cloth, 3*s.* 6*d.*

DR. W. TYLER SMITH.

A MANUAL OF OBSTETRICS, THEORETICAL AND PRACTICAL. Illustrated with 186 Engravings. Fcap. 8vo. cloth, 12*s.* 6*d.*

DR. SNOW.

ON CHLOROFORM AND OTHER ANÆSTHETICS: THEIR ACTION AND ADMINISTRATION. Edited, with a Memoir of the Author, by Benjamin W. Richardson, M.D. 8vo. cloth, 10*s.* 6*d.*

MR. J. VOSE SOLOMON, F.R.C.S.

TENSION OF THE EYEBALL; GLAUCOMA: some Account of the Operations practised in the 19th Century. 8vo. cloth, 4*s.*

DR. STANHOPE TEMPLEMAN SPEER.

PATHOLOGICAL CHEMISTRY, IN ITS APPLICATION TO THE PRACTICE OF MEDICINE. Translated from the French of MM. Becquerel and Rodier. 8vo. cloth, reduced to 8*s.*

* * *

MR. J. K. SPENDER, M.D.LOND.

A MANUAL OF THE PATHOLOGY AND TREATMENT OF ULCERS AND CUTANEOUS DISEASES OF THE LOWER LIMBS. 8vo. cloth, 4*s.*

* * *

MR. PETER SQUIRE.

I.

A COMPANION TO THE BRITISH PHARMACOPÆIA. Seventh Edition. 8vo. cloth, 10*s.* 6*d.*

II.

THE PHARMACOPÆIAS OF THE LONDON HOSPITALS, arranged in Groups for easy Reference and Comparison. Second Edition. 18mo. cloth, 5*s.*

* * *

DR. STEGGALL.

I.

A MEDICAL MANUAL FOR APOTHECARIES' HALL AND OTHER MEDICAL BOARDS. Twelfth Edition. 12mo. cloth, 10*s.*

II.

A MANUAL FOR THE COLLEGE OF SURGEONS; intended for the Use of Candidates for Examination and Practitioners. Second Edition. 12mo. cloth, 10*s.*

III.

FIRST LINES FOR CHEMISTS AND DRUGGISTS PREPARING FOR EXAMINATION AT THE PHARMACEUTICAL SOCIETY. Third Edition. 18mo. cloth, 3*s.* 6*d.*

* * *

MR. STOWE, M.R.C.S.

A TOXICOLOGICAL CHART, exhibiting at one view the Symptoms, Treatment, and Mode of Detecting the various Poisons, Mineral, Vegetable, and Animal. To which are added, concise Directions for the Treatment of Suspended Animation. Twelfth Edition. revised. On Sheet, 2*s.*; mounted on Roller, 5*s.*

* * *

MR. FRANCIS SUTTON, F.C.S.

A SYSTEMATIC HANDBOOK OF VOLUMETRIC ANALYSIS; or, the Quantitative Estimation of Chemical Substances by Measure. With Engravings. Post 8vo. cloth, 7*s.* 6*d.*

* * *

MR. W. P. SWAIN, F.R.C.S.

INJURIES AND DISEASES OF THE KNEE-JOINT, and their Treatment by Amputation and Excision Contrasted. Jacksonian Prize Essay. With 36 Engravings. 8vo. cloth, 9*s.*

* * *

DR. SWAYNE.

OBSTETRIC APHORISMS FOR THE USE OF STUDENTS COMMENCING MIDWIFERY PRACTICE. With Engravings on Wood. Fourth Edition. Fcap. 8vo. cloth, 3*s.* 6*d.*

SIR ALEXANDER TAYLOR, M.D., F.R.S.E.

THE CLIMATE OF PAU; with a Description of the Watering Places of the Pyrenees, and of the Virtues of their respective Mineral Sources in Disease. Third Edition. Post 8vo. cloth, 7*s*.

DR. ALFRED S. TAYLOR, F.R.S.

I.

THE PRINCIPLES AND PRACTICE OF MEDICAL JURISPRUDENCE. With 176 Wood Engravings. 8vo. cloth, 28*s*.

II.

A MANUAL OF MEDICAL JURISPRUDENCE. Eighth Edition. With Engravings. Fcap. 8vo. cloth, 12*s*. 6*d*.

III.

ON POISONS, in relation to MEDICAL JURISPRUDENCE AND MEDICINE. Second Edition. Fcap. 8vo. cloth, 12*s*. 6*d*.

DR. THEOPHILUS THOMPSON, F.R.S.

CLINICAL LECTURES ON PULMONARY CONSUMPTION; with additional Chapters by E. SYMES THOMPSON, M.D. With Plates. 8vo. cloth, 7*s*. 6*d*.

DR. THOMAS.

THE MODERN PRACTICE OF PHYSIC; exhibiting the Symptoms, Causes, Morbid Appearances, and Treatment of the Diseases of all Climates. Eleventh Edition. Revised by ALGERNON FRAMPTON, M.D. 2 vols. 8vo. cloth, 28*s*.

SIR HENRY THOMPSON, F.R C.S.

I.

STRICTURE OF THE URETHRA AND URINARY FISTULÆ; their Pathology and Treatment. Jacksonian Prize Essay. With Plates. Third Edition. 8vo. cloth, 10*s*.

II.

THE DISEASES OF THE PROSTATE; their Pathology and Treatment. With Plates. Third Edition. 8vo. cloth, 10*s*.

III.

PRACTICAL LITHOTOMY AND LITHOTRITY; or, An Inquiry into the best Modes of removing Stone from the Bladder. With numerous Engravings, 8vo. cloth, 9*s*.

IV.

CLINICAL LECTURES ON DISEASES OF THE URINARY ORGANS. With Engravings. Second Edition. Crown 8vo. cloth, 5*s*.

DR. THOROWGOOD, M.D.LOND.

NOTES ON ASTHMA; its Nature, Forms and Treatment. Crown 8vo. cloth, 4*s*.

DR. THUDICHUM.

I.

A TREATISE ON THE PATHOLOGY OF THE URINE, Including a complete Guide to its Analysis. With Plates, 8vo. cloth, 14*s*.

II.

A TREATISE ON GALL STONES: their Chemistry, Pathology, and Treatment. With Coloured Plates. 8vo. cloth, 10*s*.

DR. TILT.

I.

ON UTERINE AND OVARIAN INFLAMMATION, AND ON THE PHYSIOLOGY AND DISEASES OF MENSTRUATION. Third Edition. 8vo. cloth, 12*s.*

II.

A HANDBOOK OF UTERINE THERAPEUTICS AND OF DISEASES OF WOMEN. Third Edition. Post 8vo. cloth, 10*s.*

III.

THE CHANGE OF LIFE IN HEALTH AND DISEASE: a Practical Treatise on the Nervous and other Affections incidental to Women at the Decline of Life. Second Edition. 8vo. cloth, 6*s.*

DR. GODWIN TIMMS.

CONSUMPTION: its True Nature and Successful Treatment. Re-issue, enlarged. Crown 8vo. cloth, 10*s.*

DR. ROBERT B. TODD, F.R.S.

I.

CLINICAL LECTURES ON THE PRACTICE OF MEDICINE. *New Edition, in one Volume, Edited by* DR. BEALE, *8vo. cloth,* 18*s.*

II.

ON CERTAIN DISEASES OF THE URINARY ORGANS, AND ON DROPSIES. Fcap. 8vo. cloth, 6*s.*

MR. TOMES, F.R.S.

A MANUAL OF DENTAL SURGERY. With 208 Engravings on Wood. Fcap. 8vo. cloth, 12*s.* 6*d.*

DR. TURNBULL.

I.

AN INQUIRY INTO THE CURABILITY OF CONSUMPTION, ITS PREVENTION, AND THE PROGRESS OF IMPROVEMENT IN THE TREATMENT. Third Edition. 8vo. cloth, 6*s.*

II.

A PRACTICAL TREATISE ON DISORDERS OF THE STOMACH with FERMENTATION; and on the Causes and Treatment of Indigestion, &c. 8vo. cloth, 6*s.*

MR. TUSON, F.C.S.

A PHARMACOPŒIA; including the Outlines of Materia Medica and Therapeutics, for the Use of Practitioners and Students of Veterinary Medicine. Post 8vo. cloth, 7*s.*

DR. TWEEDIE, F.R.S.

CONTINUED FEVERS: THEIR DISTINCTIVE CHARACTERS, PATHOLOGY, AND TREATMENT. With Coloured Plates. 8vo. cloth, 12*s.*

DR. UNDERWOOD.

TREATISE ON THE DISEASES OF CHILDREN. Tenth Edition, with Additions and Corrections by HENRY DAVIES, M.D. 8vo. cloth, 15*s.*

* * *

VESTIGES OF THE NATURAL HISTORY OF CREATION. Eleventh Edition. Illustrated with 106 Engravings on Wood. 8vo. cloth, 7*s.* 6*d.*

PROF. SCHROEDER VAN DER KOLK,

THE PATHOLOGY AND THERAPEUTICS OF MENTAL DISEASES. Translated by Mr. Rudall, F.R.C.S. 8vo. cloth, 7*s.* 6*d.*

MR. WADE, F.R.C.S.

STRICTURE OF THE URETHRA, ITS COMPLICATIONS AND EFFECTS; a Practical Treatise on the Nature and Treatment of those Affections. Fourth Edition. 8vo. cloth, 7*s.* 6*d.*

DR. WAHLTUCH, M.D.

A DICTIONARY OF MATERIA MEDICA AND THERAPEUTICS. 8vo. cloth, 15*s.*

DR. WALKER, M.B.LOND.

ON DIPHTHERIA AND DIPHTHERITIC DISEASES. Fcap. 8vo. cloth, 3*s.*

DR. WALLER.

ELEMENTS OF PRACTICAL MIDWIFERY; or, Companion to the Lying-in Room. Fourth Edition, with Plates. Fcap. cloth, 4*s.* 6*d.*

MR. HAYNES WALTON, F.R.C.S.

SURGICAL DISEASES OF THE EYE. With Engravings on Wood. Second Edition. 8vo. cloth, 14*s.*

DR. WARING, M.D., M.R.C.P.LOND.

I.

A MANUAL OF PRACTICAL THERAPEUTICS. Second Edition, Revised and Enlarged. Fcap. 8vo. cloth, 12*s.* 6*d.*

II.

THE TROPICAL RESIDENT AT HOME. Letters addressed to Europeans returning from India and the Colonies on Subjects connected with their Health and General Welfare. Crown 8vo. cloth, 5*s.*

DR. WATERS, F.R.C.P.

I.

DISEASES OF THE CHEST. CONTRIBUTIONS TO THEIR CLINICAL HISTORY, PATHOLOGY, AND TREATMENT. With Plates. 8vo. cloth, 12*s.* 6*d.*

II.

THE ANATOMY OF THE HUMAN LUNG. The Prize Essay to which the Fothergillian Gold Medal was awarded by the Medical Society of London. Post 8vo. cloth, 6*s.* 6*d.*

III.

RESEARCHES ON THE NATURE, PATHOLOGY, AND TREATMENT OF EMPHYSEMA OF THE LUNGS, AND ITS RELATIONS WITH OTHER DISEASES OF THE CHEST. With Engravings. 8vo. cloth, 5*s.*

DR. ALLAN WEBB, F.R.C.S.L.

THE SURGEON'S READY RULES FOR OPERATIONS IN SURGERY. Royal 8vo. cloth, 10*s.* 6*d.*

MR. SOELBERG WELLS.

I.

A TREATISE ON THE DISEASES OF THE EYE. With Coloured Plates and Wood Engravings. 8vo. cloth, 24*s.*

II.

ON LONG, SHORT, AND WEAK SIGHT, and their Treatment by the Scientific Use of Spectacles. Third Edition. With Plates. 8vo. cloth, 6*s.*

* * *

MR. T. SPENCER WELLS, F.R.C.S.

SCALE OF MEDICINES FOR MERCHANT VESSELS. With Observations on the Means of Preserving the Health of Seamen, &c. &c. Seventh Thousand. Fcap. 8vo. cloth, 3*s.* 6*d.*

* * *

DR. WEST.

LECTURES ON THE DISEASES OF WOMEN. Third Edition. 8vo. cloth, 16*s.*

* * *

MR. WHEELER.

HAND-BOOK OF ANATOMY FOR STUDENTS OF THE FINE ARTS. With Engravings on Wood. Fcap. 8vo., 2*s.* 6*d.*

* * *

DR. WHITEHEAD, F.R.C.S.

ON THE TRANSMISSION FROM PARENT TO OFFSPRING OF SOME FORMS OF DISEASE, AND OF MORBID TAINTS AND TENDENCIES. Second Edition. 8vo. cloth, 10*s.* 6*d.*

* * *

DR. WILLIAMS, F.R.S.

PRINCIPLES OF MEDICINE: An Elementary View of the Causes, Nature, Treatment, Diagnosis, and Prognosis, of Disease. With brief Remarks on Hygienics, or the Preservation of Health. The Third Edition. 8vo. cloth, 15*s.*

* * *

DR. WINSLOW, M.D., D.C.L.OXON.

OBSCURE DISEASES OF THE BRAIN AND MIND. Fourth Edition. Carefully Revised. Post 8vo. cloth, 10*s.* 6*d.*

* * *

DR. WISE, M.D., F.R.C.P.EDIN.

REVIEW OF THE HISTORY OF MEDICINE AMONG ASIATIC NATIONS. Two Vols. 8vo. cloth, 16*s.*

MR. ERASMUS WILSON, F.R.S.

I.

THE ANATOMIST'S VADE-MECUM: A SYSTEM OF HUMAN ANATOMY. With numerous Illustrations on Wood. Eighth Edition. Foolscap 8vo. cloth, 12*s.* 6*d.*

II.

ON DISEASES OF THE SKIN: A SYSTEM OF CUTANEOUS MEDICINE. Sixth Edition. 8vo. cloth, 18*s.*

THE SAME WORK; illustrated with finely executed Engravings on Steel, accurately coloured. 8vo. cloth, 36*s.*

III.

HEALTHY SKIN: A Treatise on the Management of the Skin and Hair in relation to Health. Seventh Edition. Foolscap 8vo. 2*s.* 6*d.*

IV.

PORTRAITS OF DISEASES OF THE SKIN. Folio. Fasciculi I. to XII., completing the Work. 20*s.* each. The Entire Work, half morocco, £13.

V.

THE STUDENT'S BOOK OF CUTANEOUS MEDICINE AND DISEASES OF THE SKIN. Post 8vo. cloth, 8*s.* 6*d.*

VI.

ON SYPHILIS, CONSTITUTIONAL AND HEREDITARY; AND ON SYPHILITIC ERUPTIONS. With Four Coloured Plates. 8vo. cloth, 16*s.*

VII.

A THREE WEEKS' SCAMPER THROUGH THE SPAS OF GERMANY AND BELGIUM, with an Appendix on the Nature and Uses of Mineral Waters. Post 8vo. cloth, 6*s.* 6*d.*

VIII.

THE EASTERN OR TURKISH BATH: its History, Revival in Britain, and Application to the Purposes of Health. Foolscap 8vo., 2*s.*

* * *

DR. G. C. WITTSTEIN.

PRACTICAL PHARMACEUTICAL CHEMISTRY: An Explanation of Chemical and Pharmaceutical Processes, with the Methods of Testing the Purity of the Preparations, deduced from Original Experiments. Translated from the Second German Edition, by STEPHEN DARBY. 18mo. cloth, 6*s.*

* * *

DR. HENRY G. WRIGHT.

I.

UTERINE DISORDERS: their Constitutional Influence and Treatment. 8vo. cloth, 7*s.* 6*d.*

II.

HEADACHES; their Causes and their Cure. Fourth Edition. Fcap. 8vo. 2*s.* 6*d.*

* * *

DR. YEARSLEY, M.D., M.R.C.S.

I.

DEAFNESS PRACTICALLY ILLUSTRATED; being an Exposition as to the Causes and Treatment of Diseases of the Ear. Sixth Edition. 8vo. cloth, 6*s.*

II.

ON THROAT AILMENTS, MORE ESPECIALLY IN THE ENLARGED TONSIL AND ELONGATED UVULA. Eighth Edition. 8vo. cloth, 5*s.*

CHURCHILL'S SERIES OF MANUALS.

Fcap. 8vo. cloth, 12*s.* 6*d.* each.

"We here give Mr. Churchill public thanks for the positive benefit conferred on the Medical Profession, by the series of beautiful and cheap Manuals which bear his imprint."—*British and Foreign Medical Review.*

AGGREGATE SALE, 154,000 COPIES.

ANATOMY. With numerous Engravings. Eighth Edition. By Erasmus Wilson, F.R.C.S., F.R.S.

BOTANY. With numerous Engravings. By Robert Bentley, F.L.S., Professor of Botany, King's College, and to the Pharmaceutical Society.

CHEMISTRY. With numerous Engravings. Tenth Edition, 14*s.* By George Fownes, F.R.S., H. Bence Jones, M.D., F.R.S., and Henry Watts, B.A., F.R.S.

DENTAL SURGERY. With numerous Engravings. By John Tomes, F.R.S.

EYE, DISEASES OF. With coloured Plates and Engravings on Wood. By C. Macnamara.

MATERIA MEDICA. With numerous Engravings. Fifth Edition. By J. Forbes Royle, M.D., F.R.S., and F. W. Headland, M.D., F.L.S.

MEDICAL JURISPRUDENCE. With numerous Engravings. Eighth Edition. By Alfred Swaine Taylor, M.D., F.R.S.

PRACTICE OF MEDICINE. Second Edition. By G. Hilaro Barlow, M.D., M.A.

The MICROSCOPE and its REVELATIONS. With numerous Plates and Engravings. Fourth Edition. By W. B. Carpenter, M.D., F.R.S.

NATURAL PHILOSOPHY. With numerous Engravings. Sixth Edition. By Charles Brooke, M.B., M.A., F.R.S. *Based on the Work of the late Dr. Golding Bird.*

OBSTETRICS. With numerous Engravings. By W. Tyler Smith, M.D., F.R.C.P.

OPHTHALMIC MEDICINE and SURGERY. With coloured Plates and Engravings on Wood. Third Edition. By T. Wharton Jones, F.R.C.S., F.R.S.

PATHOLOGICAL ANATOMY. With numerous Engravings. By C. Handfield Jones, M.B., F.R.S., and E. H. Sieveking, M.D., F.R.C.P.

PHYSIOLOGY. With numerous Engravings. Fourth Edition. By William B. Carpenter, M.D., F.R.S.

POISONS. Second Edition. By Alfred Swaine Taylor, M.D., F.R.S.

PRACTICAL ANATOMY. With numerous Engravings. Second Edition. By Christopher Heath, F.R.C.S.

PRACTICAL SURGERY. With numerous Engravings. Fourth Edition. By Sir William Fergusson, Bart., F.R.C.S., F.R.S.

THERAPEUTICS. Second Edition. By E. J. Waring, M.D., M.R.C.P.

Printed by Blanchard & Sons, 62, Millbank Street, Westminster.

BOUND BY
EDMONDS & REMNANTS
LONDON